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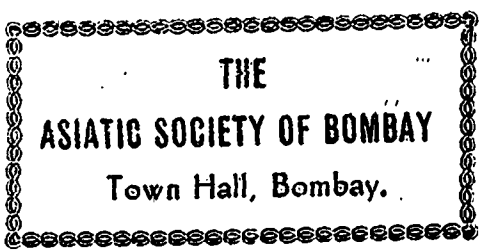

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PART
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[Price

SPECIES FILICUM;

BEING

DESCRIPTIONS

OF

ALL KNOWN FERNS.

ILLUSTRATED WITH PLATES.

B2202

BY

88524

SIR WILLIAM JACKSON HOOKER, K.H., LL.D., F.R.A. & L.S.

&c.

VICE-PRESIDENT OF THE LINNEAN SOCIETY OF LONDON,

AND DIRECTOR OF THE ROYAL BOTANIC GARDEN OF KEW.

It is intended to publish Part the seventh shortly.

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LONDON:

WILLIAM PAMPLIN, 45, FRITH STREET, SOHO SQUARE.

M.DCCC.LII

E. NEWMAN, PRI[NTER], [45], FRITH STREET, BISHOPSGATE.

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SPECIES FILICUM.

BY

SIR W. J. HOOKER, K.H., &c.

&c. &c. &c.

PART VI

CONTAINING

POLYPODIACEÆ—IN PART.

ADIANTUM, &c.

PLATES [illegible]—XCI to CX

LONDON:

WILLIAM PAMPLIN.

1851

lenso, J. D. Hooker, and others. Luzon, *Cuming, n.* 118 and 233 (stipes and rachis browner).—*β.* New Zealand; Wahaki, *Dr. Sinclair.* Bay of Islands, *J. D. Hooker.*—*γ.* Between Cape Brett and Wangarei Bay, East Coast, N. Zealand, near the coast; scarce, and found nowhere else. (Tab. XC. A.) *Rev. W. Colenso, n.* 420.—Our specimens most in accordance with Forster's plant are those from the Coral Islands (some without any habitat given) in the late Capt. Carmichael's collection, and some of Dr. Hooker's from New Zealand. Forster's original plant is, however, rather more slender and the pinnæ and pinnules more erect and attenuated than any we possess: and it must be confessed that the difference between that and our var. *γ.* strike the eye, at first sight, as being very considerable. Certainly no figure of any small portion of a plant will give an accurate idea of the species itself, still less of the varieties. Yet from New Zealand alone, I possess specimens which almost satisfy me that I am correct in making varieties rather than in forming species. Even of the most remarkable variety, that of our valued friend Mr. Colenso, I find a specimen marked "N. Zealand," from Capt. Carmichael's herbarium, which seems to unite *β.* with *γ.*—We have received this and other species from N. Zealand as "*Cheilanthes ambigua*, A. Rich.": and we are not sure but this is the *C. ambigua* of Allan Cunningham, judging from a specimen we have received from Mr. Heward. Richard expressly says of his *C. ambigua*, "Au premier abord, et quand les fronds sont bien développées, on pourrait la prendre pour une espèce de *Polypodium*. En effet les sores sont arrondis, distincts et nus, correspondant à chacune des dents ou divisions des lanières. Mais si l'on examine ces frondes avant leur épanouissement, on voit alors que les divisions sont recourbées en dessous, et qu'elles recouvrent complètement chacun des sores, en lui formant une sorte d'involucre, sans, néanmoins changer de nature." (Voy. de l'Astrolabe, Bot. i. p. 84).—All this seems to point to a *Polypodium* common in New Zealand, frequently confounded with our *H. tenuifolia*, for its general aspect is very similar, probably identical with the New Holland *Polypodium rugulosum*, La Bill., and also with *Cheilanthes viscosa*, Carm., of Tristan d'Acunha, (Polypodium, *Spreng.*) In an old state of these, the teeth or lobules of the pinnules may be seen to form an arch over the sori without altering in texture: this however is very different from the involucre of *Hypolepis:* as may be seen in a portion we have represented of the var. *γ.* of the present species. (Tab. XC. A.)—There is probably some error in this species being called by Forster, and others after him, an "arborescent" fern.

2. H. *Guianensis*, Kl.; "rhizoma? frond tripinnatifid ovato-acuminate, rachises and stipes yellowish unarmed subviscoso-pubescent, pinnæ broadly lanceolate acute, secondary pinnæ lanceolate falcate obtuse sparingly puberulous on both sides, beneath bright above brownish green, pinnules lanceolato-oblong subfalcate rounded at the apex obsoletely pinnatifido-lobate sessile." *Klotzsch, in Linnæa*, 1847, *p.* 339.

Hab. British Guiana, *R. Schomburgk, n.* 1166.—"Frond 2 feet long. Superior pinnæ 3 lower ones 6 inches long attenuate confluent towards the apices."—Of this species I know nothing, and nothing is said of the sori and involucres.

3. H. *dicksonioides*; "frond ample ovate membranaceous

on both sides (more copiously beneath) glanduloso-pilose tripinnato-pinnatifid less divided at the apex, pinnæ subopposite and as well as the primary pinnules ovato-oblong acuminate, secondary ones oblong obtuse pinnatifid, segments shortly oblong subtruncate at the apex inciso-serrate, the base above or on both margins soriferous, sori solitary, stipes and rachis furrowed above and as well as the creeping caudex reddish-yellow glanduloso-pilose." *Kze.*—Cheilanthes dicksonioides, *Endl. Prodr. Fl. Norf. p.* 15. *Kze. in Schkh. Fil. Suppl.* i. *p.* 13, *t.* 8. Hypolepis Endlicheriana, *Presl, Tent. Pterid. p.* 162. — *β. phyllochlæna;* indusio (spurio) frondoso. *Kze. in Linnæa, t.* 17, *p.* 275.

Hab. Norfolk Island, *Bauer*, (*Kunze*). — *β.* Neilgherries, (*Kunze*). — Kunze in the work just quoted gives as synonymes, Endlicher's *Cheilanthes dicksonioides* and Presl's *Hypolepis Endlicheriana*, and in 'Linnæa,' xxiii. p. 243, he adduces *Dicksonia davallioides*, Br. Prodr. p. 158, (Sitolobium, *J. Sm.*): but, judging from the figure, for I have never seen an authentic specimen of the species, I do not at all see how this plant differs from the New Zealand state of what I have considered a slight variety (*β.*) of *Hypolepis tenuifolia*. At any rate it must be very closely allied to it, and I place it near to that, although its author compares it with *H. repens*, a species, as far as I know, confined to the New World. In the 'Linnæa' above quoted, too, Kunze gives his *C. dicksonioides* as a native of N. Holland.—Kunze again in the 'Linnæa,' xvii. p. 275, in describing the Ferns of the Neilgherry hills, notices a *Cheilanthes* (Hypolepis) which he does not distinguish from the *dicksonioides* except by the (spurious) frondose indusium.

4. H. *amaurorachis;* "frond membranaceous piloso-scabrous ovate acuminate bi- or tri-pinnato-pinnatifid less divided at the apex, pinnæ petiolate divergent ovato-oblong acuminate the lowest ones opposite, primary pinnules decurrent oblong obtuse, secondary ones sinuato-incised the segments nearly entire soriferous on both sides, involucres (spurious) herbaceous, rachises and stipes asperous purple-brown, rhizoma creeping branched squarrose with brown chaffy hairs." *Kze.*—Cheilanthes amaurorachis, *Kze. in Linnæa*, 1850, *p.* 242 (*name*) *and p.* 306 (*descr.*)

Hab. New Holland, *Kunze*, who compares the species with his *Cheilanthes* (Hypolepis) *dicksonioides;* but remarks, "minus composita, minor, rachi stipiteque purpurascenti-fuscis, laciniis subintegerrimis nec inciso-serratis."

5. H. *setigera;* "frond below tri- above bi-pinnatifid membranaceous, the costa and secondary rachises upon the upper side pubescent, pinnules sessile lanceolate acute deeply pinnatifid confluent towards the apex, segments oblong rather obtuse toothed, sori solitary at the interior margin of a tooth,

involucres obsolete, stipes and universal rachis sparingly setose." Cheilanthes setigera, *Blume, En. Fil. Jav. p.* 138.

Hab. Lofty mountains of Java. —This and the three following species of *Cheilanthes* of Blume I refer to *Hypolepis* (three of them from individual knowledge), because the author says of them in his Enum. Fil. Jav. p. 135, "tam habitu quam forma sororum maxime cum *Cheilanthe arborescente*, Sw., congruunt;" and he adds "melius forsitan foret, species, quarum sori unico laciniarum lateri insident, a ceteris, ut genus *Cheilanthem* inter et *Lonchitidem* intermedium separare."—Of the present, *H. setigera*, he remarks that it differs from the following in the sharper pinnules, the segments narrower and toothed, the universal rachis furnished with long setæ.

6. H. *alpina;* "frond below tri- above bi-pinnatifid membranaceous pubescent, pinnules subsessile lanceolate rather obtuse deeply pinnatifid confluent above, sori solitary at the interior margin of the crenulations, involucres dentiform, stipes and rachis rough." Cheilanthes alpina, *Bl. Enum. Fil. Jav. p.* 138.—*β.* frond coriaceous, pinnules acute, segments crenate the margins recurved, stipes and rachis tomentose. *Bl. l. c.*

Hab. Summit of Mount Gede in western Java; *β.* on the lofty mountains of Java, *Blume.*—"The place of this is after *Cheilanthes repens*, Kaulf."

7. H. *resinifera*; "frond below tri- above bi-pinnatifid subcoriaceous beneath resinoso-punctate, pinnules sessile lanceolate acuminate deeply pinnatifid confluent above, the segments oblong obtuse inciso-crenate subauriculate at the base above, sori solitary at the interior margin of the crenulations, involucres dentiform, rachis tomentose above, stipes rough." Cheilanthes resinifera, *Blume, Enum. Fil. Jav. p.* 138.

Hab. Thick woods interior of Java, *Blume.* "Near the latter species (*C. alpina*), but distinct in the much acuminated pinnules, resinoso-farinose beneath, hairy, the lower crenule or lacinula of the segments larger on the upper side."

8. H. *polypodioides;* "frond (ample) triplicato-pinnate, pinnules petiolate ovato-lanceolate acuminate bipinnatifid confluent above, secondary ones oblongo-lanceolate deeply pinnatifid, the segments obtuse subduplicato-serrate, sori distinct, involucres dentiform, stipes and rachis pubescent scabrous." Cheilanthes polypodioides, *Bl. Enum. Fil. Jav. p.* 139.

Hab. Gede and other high mountains of Java, *Blume.* — "*Cheilanthes arborescens*, Sw., differs from this in the glabrous frond and the solitary sori at the interior or superior margin of the segments: from *C. resinifera* it is distinguished by the larger triplicato-pinnate frond, and by the larger, acuminated primary pinnules." *Bl.*

9. H. *pallida*; "frond ample triplicato-pinnate subcoriaceous, beneath (pale yellowish and) pubescent, pinnules petiolate oblong-lanceolate acuminate bipinnatifid confluent above, secondary pinnules oblong obtuse pinnatifid, the segments obtuse crenulate, sori solitary on the anterior margin of the laciniæ, involucres dentiform, stipes and rachis scabrous tomentose above." Cheilanthes pallida, *Bl. Enum. Fil. Jav. p.* 139.

Hab. Woody mountains, Province of Bantam, western Java. — "From *Ch. arborescens*, Sw., this is distinguished by its frond being pubescent beneath; from *Ch. polypodioides*, in the smaller and more rigid pinnules, the segments shorter, obsoletely crenulated, mono- rarely poly-sorous."—Of this and *H. polypodioides* and *alpina* I have been favoured with portions of specimens from the distinguished author, but they will hardly suffice to justify me in forming an opinion about them. They assuredly border very closely on *H. tenuifolia*.

10. H. *repens*, Presl; fronds ample tri-pinnate between membranaceous and coriaceous yellow or tawny green (when dry) opaque, primary pinnæ ovate acuminate, secondary ones lanceolato-acuminate glabrous or very sparsely hirsute, pinnules or ultimate segments oblong obtuse slightly falcate entire or pinnatifid, lobes oval-oblong obtuse bearing usually a single sorus on their anterior margin, involucres small squamiform, stipes and principal rachises glabrous yellow-brown glossy aculeated. (Tab. XC. B.) *Presl, Tent. Pterid. p.* 162. Lonchitis repens, *L. Swartz, Syn. Fil. p.* 93. *Willd. Sp. Pl.* v. *p.* 464. Cheilanthes repens, *Kaulf. Enum. Fil. p.* 215. Ch. aculeata, *Kze. in Linnæa*, 1850, *p.* 245. *Kaulf. in Bot. Zeit.* 1823, *p.* 367. Hypolepis repens et aculeata, *J. Sm. Sieber, Fl. Martin. n.* 373. *Plum. Fil. t.* 12, (much exaggerated).—*β. ? inermis;* rachises and stipes smooth (not aculeated).

Hab. Martinique, *Plumier, Sieb. l. c. n.* 373, (*in Herb. nostr.*). Jamaica, *Wiles, Dr. Bancroft, Purdie.* Brazil; Ilhios, *Moricand*, n. 2460; Organ Mountains, *Gardner, n.* 199. Galapagos, *Capt. J. Wood, R. N.* Tovar, Columbia, *Moritz.* (*Herb. Sonder, n.* 387). *β.* ? New Grenada, *Purdie.*— Plumier's figure, which is quoted by the older authors as an authority for this plant, is, if intended for it, so exaggerated as only to tend to mislead. In the absence of any better authority we have taken our figure from Sieber's Martinique specimen, which quite accords with our specimens from Jamaica and Brazil. — I am quite unable to decide on the place of Mr. Purdie's unarmed specimens; for except that the pinnules are generally more villous and somewhat glandularly so beneath, and the stipes and rachis have no aculei, the Fern is quite that of our *H. repens*.

11. H. *resistens;* "frond ample coriaceous hispidulous on the nerves and veins discoloured oblong the apex attenuated

subtripinnate or tripinnato-pinnatifid the apex more simple, primary pinnæ remote shortly petiolate subopposite divergenti-patent oblong attenuated with an upward curvature, secondary rather remote subsessile divergent from a broader base oblong attenuated slightly curved, tertiary approximate decurrent from the adnate base shortly oblong obtuse pinnatifid, segments falcato-ovate obtuse sparingly crenate or with the pinnules sinuated the lobes suborbiculate, sori large situated in the upper base of the lacinia solitary in the sinus rarely two, the second on the opposite side of the sinus, indusium marginal herbaceous, the costæ beneath convex yellowish, sulcate above and together with the stout rachises and short or moderately elongated stipes purple-brown viscosely hispid, rhizoma creeping squarrosely piloso-paleaceous, scales of a rusty colour." *Kze.* — Cheilanthes resistens, *Kunze, in Linnæa*, xvii. *p.* 275.

Hab. Neilgherries (*Kunze*). — Instead of the copious specific character occupying just half a page of the 'Linnæa,' we wish the able author could have given us a figure, which would have been far more intelligible. We are not however at a loss for the affinities of this (if it be really distinct). "It comes near" he says "to the western *Cheilanthes repens*, Kaulf.: but differs in the stouter rachises, of a purplish brown colour, not aculeolate, but glandularly or viscidly hispid; in the more coriaceous frond, in the distinctly crenato-serrated pinnules, and the herbaceous indusium."

12. H. *parallelogramma;* frond ample (10—20 feet long) nearly glabrous glossy bi- scarcely tri-pinnate subcoriaceous yellow-brown when dry, primary pinnæ ovate acuminate, secondary sessile or nearly so narrow oblong much acuminated subfalcate closely pinnated at the base (in some) the rest closely pinnatifid, pinnules and lobes adnate parallelogram, fertile ones sinuato-lobate at the margin the sinuses soriferous, involucres semilunate hard coriaceous, stipes and rachis tawny brown rough with minute points scarcely aculeolate. (Tab. LXXVIII. A.)—Cheilanthes parallelogramma, *Kze. in Linnæa*, ix. *p.* 83.

Hab. Woody mountains of Pampayaco, Peru, *Poeppig* (*in Herb. nostr.*) Bamboo-grounds, rare, Tovar, Columbia, *Moritz*, (*Herb. Sonder, n.* 338). —My specimen of this from Dr. Poeppig had, evidently by mistake, a label with the name "*Dicksonia erosa*, Kze." attached to it: a Fern found by that author in the same country. The present is well described by Kunze in the volume of the 'Linnæa' above quoted. He justly observes "Similis *C. repenti*, Kaulf., sed abunde differt." It is the most coriaceous and glossy in its frond of any species of *Hypolepis* I know: the nerves of the pinnules are strong and prominent beneath: the texture thick and opaque. Our figure gives an excellent representation of a perfect pinna in the upper part of the plant: below, where the pinnules are again

divided, they are more acute and acuminate. Kunze and Moritz and Poeppig describe the plant as attaining a length of 20 feet! The fine specimen for which I am indebted to Mr. Sonder is 8 feet long.

13. H. *nigrescens*, Hook.; fronds ample straggling submembranaceous 3-4-pinnate glabrous brownish black when dry opaque, primary pinnæ distant often opposite very patent ovate acuminate, secondary and tertiary pinnæ rather short oblong moderately acuminated, ultimate pinnules or segments oblong obtuse pinnatifid, lobes oval obtuse entire bearing a small single sorus on the anterior margin, involucres very small squamiform, stipes and principal rachis flexuose glabrous polished dark brown aculeated. (Tab. XC. C.) H. repens, *J. Sm. Enum. Fil. Philip. in Hook. Journ. Bot.* iii. *p.* 404.

Hab. Jamaica, *Wilson, Wiles, Purdie*, (*Herb. Hook. et J. Sm.*) Caracas, *Linden, n.* 5 *and* 6. Luzon, *Cuming, n.* 271.—In words or even in a small figure it is scarcely possible to define the characteristic distinctions of this plant, which in many respects resembles *H. repens*. Mr. J. Smith indeed published the Philippine Island plant as such, and stated that it exactly accorded with the plant of that name from Jamaica. This is so far true that he rightly considered the plant of Cuming identical with what he and I independently of each other had considered the *H. repens*; that is, a Jamaica *Hypolepis* which accorded with the ordinary description of the *H. repens*. As already stated, however, I have adopted another form of *Hypolepis*, viz., that of Sieber and Kaulfuss, as the true *H. repens*; and the present species is at once, by the eye, distinguishable from that, by its more lax habit, more membranaceous texture, shorter pinnæ, and much shorter ultimate pinnules, with fewer and smaller fructifications. The aculeated stipes and rachis are the same in both.

14. H. *anthriscifolia*, Pr.; fronds ample tripinnate hairy on the midrib and veins beneath tender green membranaceous, primary pinnæ oblong ovate acuminate, secondary ones broad oblong acuminate, pinnules linear-oblong subfalcate deeply pinnatifid, lobes small uniform entire or one- or two-toothed bearing a solitary sorus in the inner margin, involucres small squamiform, stipes and rachis rich yellow-brown glabrous asperulous. (Tab. XCV. A.) *Presl, Tent. Pterid. p.* 162. Cheilanthes anthriscifolia, *Willd. Sp. Pl.* v. *p.* 461. Lonchitis anthriscifolia, *Bory, MSS.* Dicksonia, *Kaulf. Enum. Fil. p.* 227, *et Boj. Hort. Maur. p.* 409. Cheilanthes commutata, *Kze. in Linnæa*, x. *p.* 542, (according to Drége's specimen). Ch. sparsisora, "*Schrad. in Goet. gel. Anz.* 1818, *p.* 918." *Kze. in Linnæa*, x. *p.* 542.

Hab. Woods in Bourbon, *Bory, Carmichael.* Mauritius, *Bojer, Telfair.* S. Africa, *Villette, Miller, Dr. Alexander, Drége, Zeyher, n.* 4633.—A very elegant and delicate species, the pinnæ and pinnules divided and cut with great regularity. I have the good fortune to possess specimens from Bourbon, gathered there by Capt. Carmichael. The Mauritius specimens are

identical therewith, and I am certain that those from the Cape here adduced, and which have been taken up by Kunze under the name of *Cheilanthes commutata*, are in no way different. I bring hither the *Cheilanthes sparsisora* of Schrader, in consequence of the remark of Kunze in the 'Linnæa' above quoted, "Sequenti (his *Ch. commutata*—our *Hyp. anthriscifolia*) omnino similis videtur."

15. H. *elata*, Pr.; "frond triangular (triplicato)- quadri-pinnato-pinnatifid tender membranaceous, pinnæ and primary pinnules petiolate subalternate very remote erecto-patent and as well as the secondary ones subsessile ovato-lanceolate very acuminate, tertiary ones oblong obtuse inciso-pinnatifid or sinuated on each side slightly clothed with whitish hairs, sori and true involucres semiorbiculate situated in the sinus of the laciniæ, stipes elongated and as well as the rachis flexuose purple clothed with reddish chaffy hairs and rough." Cheilanthes elata, *Kze. in Linnæa*, x. p. 542. Hypolepis elata, *Pr.*

Hab. South Africa, in woods at Koratra, *Drége*, (*in Herb. nostr.*)—"*C. Bergiana* differs in the pinnæ and pinnules not being acuminated, in the segments being obliquely obovate and stipes short. *C. sparsisora*, Schrad., according to the very short diagnosis, has the frond less divided, the segments nearly inciso-serrate: *C. commutata* has the involucres fixed near the sinus, &c."—Our own specimen from Drége is so withered and badly preserved that it would be difficult from it to speak of its affinities. As far as can be judged, it is little if at all different from *Hypolepis* (or *Cheilanthes*) *aspera*, Kaulf. sent also by Drége.

16. H. *aspera*, Pr.; "fronds tripinnate, pinnules lanceolate pinnatifido-incised, segments subdentate, rachis asperous, sori solitary at the superior base of the laciniæ, involucres squamiform-subreniform." *Kaulf.* — *Presl, Tent. Pterid. p.* 162. Cheilanthes aspera, *Kaulf. in Linnæa*, vi. *p.* 186. *Kze. in Linnæa*, x. *p.* 544.

Hab. South Africa, *Ecklon*, *Drége*.—If Drége's specimen so named, which I possess, be the same with Ecklon's described by Kaulfuss, the plant scarcely appears to be different from *H. anthriscifolia*: my specimen (a very perfect one) is more rigid and less deeply cut in the ultimate pinnules. Kunze, too, *l. c.*, observes, "a precedente (*C. commutata*, Kze., *C. anthriscifolia*, Schlecht.) satis differre videtur, fronde rigidiori, subcoriacea; pinnis erecto-patentibus laciniis subdentatis, rachique aspera:" and adds "a *C. repente*, Klfs. longius distat." Kaulfuss compares it with *Hypolepis* (Cheilanthes) *repens*, "cui proxima," he says: the latter differing in the obtuse pinnules dilated at the apex in the aculeated rachis and smaller involucres.—Indeed it may be truly said that all the preceding species and some of the following have a *very* close affinity with each other.

17. H. *Bergiana*; fronds tripinnate thin tender-membranaceous semipellucid dark olive-green (when dry) sparsely hirsute on both sides with fulvous hairs, primary pinnæ ovate moderately acuminated, secondary ones oblong rather obtuse,

tertiary ones or pinnules and primary lobes subovate rather oblique entire or pinnatifid, involucres (young) very small situated at the inner margin of a lobe or lobule membranaceous, stipes and primary rachises deep purple-black and as well as the secondary rachises and costa clothed with rusty hairs.—Cheilanthes Bergiana, "*Schlecht. Adumbr. Fil. p.* 51, *(t.* 30, *adhuc inedita).*" *Kunze, in Linnæa,* x. *p.* 541.

Hab. South Africa, *Ecklon, Drége* (*in Herb. nostr.*), *Krebs.* — I regret that, as before observed, my copy of Schlechtendal's 'Adumbratio Filicum' does not extend to p. 51; and I have no access to a description or authentic specimen or figure, unless Drége's specimen marked "Cheilanthes Bergiana, *Schlecht.*" may be considered so. This too I am sorry to say is but the lower portion of a young frond, with a stipes scarcely more than a span long. Judging from this it is distinct from any *Hypolepis* I am acquainted with: in the form of its ultimate lobes and pinnules showing some affinity with *H. repens;* but in little else. Kunze observes, "E distinctissimis generis! Specimina nostra triplicato-tri-s. quadripinnata inter longitudinem 4 et 16 pollicum variant. Caudex repens, radicibus elongatis ramulosis. Quoad reliqua v. descriptionem Schlechtendalianam."

18. H. *rugulosa;* fronds rather large tripinnate rigid coriaceus opaque dark brown when dry slightly hairy beneath, ramification much divaricated, primary pinnæ ovate acuminated, secondary broad-lanceolate moderately acuminated, pinnules oblong rather obtuse deeply pinnatifid the segments entire or more or less incised, sori transversely oblong one on each lobe, the lobe obliquely reflexed forming the involucre becoming thick and hard at the base the apex scariose, stipes and very flexuose primary rachis red-brown glossy slightly viscido-hirsute and rough scarcely aculeolate. — Pteris rugulosa, *La Bill. Sert. Austro-Caledonicum, p.* 6, *t.* 8. *Guillem. Zeph. Tait. p.* 18. Cheilanthes divaricatissima, *Dryand. in Herb. Banks. MSS.*

Hab. Otaheite, *Nelson, Banks* (*in Herb. Banks.*), *D'Urville* (*in Herb. nostr.*); in mountain woods, rare, *Bidwill.* New Caledonia, *Labillardiere.* — A most distinct and well marked species, with a very zigzag main rachis to the frond and the latter beautifully cut into small lobes and teeth. Labillardiere's figure of the entire plant is excellent, not so the magnified figure and the fructification, which latter is represented too much like that of a *Pteris.* Guillemin judged, but from the figure alone, for he does not appear to have seen the plant, that it was not a good *Pteris,* but rather an *Allosorus* or a new genus. It enters nevertheless well into *Hypolepis,* having quite the habit, although the involucre is of a harder and thicker texture at the base than in any other species: its margin however is thin and membranaceous, and is curved down upon a comparatively small number of capsules that form the sorus.

19. H. *Millefolium,* Hook.; frond triangulari-ovate subspithameous coriaceo-membranaceous brown when dry tripin-

nate, primary and secondary pinnæ ovato-lanceolate, tertiary ovate obtuse deeply bipinnatifid, primary segments obovate ultimate segments cuspidato-acute, sori solitary on the inner margin of the ultimate segments, involucres evidently formed of a closely reflexed lacinia covering the sorus, stipes as long as the frond and rachises yellow brown slightly asperulous and as well as the midrib beneath hirsute with rather long crisped jointed hairs, caudex very long creeping naked (not scaly). (Tab. XCV. B.)—Cheilanthes n. sp. *Colenso, MSS. n.* 921.

Hab. Wood of a shaded moist dell, near the summit of Ruahine Mountain range, N. Zealand, and only in that spot, *Rev. W. Colenso.* — None of the present genus has the elegance of the present species, which Mr. Colenso has rightly determined to be new. My largest specimens scarcely exceed a foot in height, and the pinnules are far more deeply and beautifully cut than in *A. anthriscifolia* of Mauritius and the Cape. Here however the fronds are small and rigid and quite opaque. It is most evident in this species that the involucres are formed of the unchanged and reflected laciniæ of the pinnules, bent down upon the sorus. Caudex long and creeping.

20. H. *hostilis*, Pr.; frond triangular-ovate tripinnate, primary pinnæ petiolate remote and as well as the secondary ones sessile alternate patenti-divergent lanceolate, pinnules opposite adnate oblong obtuse inciso-pinnatifid, the segments cuneate at the base subfalcate, secondary rachises margined, primary rachis and stipes aculeolate for much of their length. *Kze. Presl, Tent. Pterid. p.* 162. Cheilanthes hostilis, *Kze. in Linnæa*, vi. *p.* 86.—*β. major;* fronds beneath hirsute with crisped subglandular hairs, stipes and all the rachis aculeolate.

Hab. Hualaga, Upper Peru, *Poeppig.* Cocos Island, Pacific, *Banks.* "Habit almost of *Dicksonia.* Caudex creeping, slender, clothed with brown scales. Stipes a foot and more long, dark brown at the base. Frond a foot or a foot and a half long, slender, dark green. Sori solitary at the base of the laciniæ; involucre spurious, at length evanescent. Allied to *C. repens*, which latter differs in the erecto-patent and much broader divisions of the fronds, and in sori being solitary in the pinnules."—A not very perfect and young, but authentic, specimen of this is in my possession. It has a very close affinity with my *H. nigricans:* but wants the very large and copious aculei of that species: and seems to hold nearly the same relation with that, that my var. *β.* of *H. repens* does with the normal state of that plant.

What I here make var. *β.* is perhaps the more perfect state of this species: the frond is 2—3 feet long, of a rich tawny brown colour, more aculeolate and with the pinnules hairy with crisped and somewhat glandular hairs beneath.

21. H. *Purdieana*, Hook.; fronds rather small ovate-oblong moderately acuminated thick-membranaceous bipinnate hirsute with viscid tawny hairs beneath, pinnæ sessile ovato-

lanceolate rather obtuse the rachis winged, pinnæ oblong obtuse lobed at the margin, the lobes rounded entire or 2—3 toothed each lobe bearing a sorus on its inner margin, involucres moderately small semiorbicular of the texture of the frond slightly scariose at the margin, stipes and main rachis orange-brown asperulous viscidly hairy the latter winged towards the apex. (Tab. XCI. B.)

Hab. Paramo of Ruiz, New Grenada, *Purdie*, (Herb. nostr. and J. Smith). — A distinct and well marked species. Stipes 8 or 9 inches long rather stout, dark brown and glossy at the base, then orange-brown, as is the main rachis, both of which are covered with ferruginous viscid hairs. Frond about as long as the stipes, bipinnate. Primary pinnæ 2 to 2½ inches long, beneath more or less glandularly hairy. Pinnules ¼ an inch long and about as much broad. The sori eventually become rather large and force back the distinct but herbaceous involucre which has a pale scariose edge. The secondary rachis is everywhere winged.

(Frond rather small bipinnate).

22. H. *distans;* glabrous small (1 or 1½ foot high), frond ovato-lanceolate glabrous brown when dry generally distantly bipinnate, pinnæ nearly opposite lanceolate acuminate, pinnules sessile lanceolate rigid subcoriaceous rather deeply pinnatifid, lobes ovate spreading, sterile ones inciso-dentate fertile ones slightly toothed, sori in their inner margin solitary, stipes about equal in length with the frond and as well as the rachis and even the midrib (beneath) aculeolate, caudex much creeping densely paleaceo-hirsute. (Tab. XCV. C.) Cheilanthes distans, *Col. MSS. n.* 1782.

Hab. Hokianga, on the west coast of the northern island, and in the valley of the Hutt, N. Zealand, *Rev. W. Colenso.* Northern extremity of the northern island, *Edgerley.*—This is simply bipinnate, and quite unlike any species with which I am acquainted. I willingly adopt Mr. Colenso's MSS. name, expressive of a character common to most of the specimens. The caudex creeps long upon the ground and is densely covered with ferruginous chaffy hairs. Stipes not exceeding a span high, and as well as the rachises and even the underside of the costa aculeolate. Frond from a span to nearly a foot high. Pinnæ very generally opposite or nearly so, spreading at right angles. Sori small, covered by involucres which appear to be inflexed lobes very much recurved of the frond, pale and membranaceous at the edge closely pressed upon the sorus.

(Fronds small deltoid very compound, segments very acute or cuspidate.— Aspidotis, *Nutt.)*

23. H. *Schimperi;* "frond subtriangular acuminate thincoriaceous glabrous concolorous subtripartite bipinnato-pinnatifid more simple at the apex, lower pinnæ ovato-oblong

the rest and the pinnules deeply pinnatifid oblong patent, the segments erecto-patent linear-lanceolate veined mucronato-serrate or incised the apex subtruncate bi- tridentate cuneate at the base, the sinus soriferous, sori and involucres marginal subrotund, stipes quadrangular moderately long, primary and secondary rachis margined furrowed purple quite smooth, caudex creeping weak densely fusco-paleaceous." *Kze.* Cheilanthes (Hypolepis) Schimperi, *Kunze, in Schk. Fil. Suppl. p.* 52, *t.* 26.

Hab. Abyssinia, *Schimper*, (*n.* 1651). — A very peculiar plant, with the habit, as Kunze well observes, of some small *Davalliæ*. We have an analogue in the following species. The frond is 3—4 inches long, pale green when dry; the stipes rather longer, in my specimens. Kunze's figure is excellent.

24. H. *Californica;* densely tufted from a short scaly creeping root, fronds small triangular slightly acuminate thin-coriaceous glabrous brown when dry deeply quadripinnate (or more correctly quadripinnatifid) lower pinnæ ovate the rest lanceolate, ultimate pinnules lanceolato-subulate the apices spinulose the sides inciso-serrate, the serratures or lacinulæ sharp pointing upwards soriferous in their sinuses, involucres pale membranaceous reniformi-lunulate rather large directed downwards, stipes dark purple glossy semiterete, rachises furrowed above compressed subulate, caudex creeping rather thick clothed with black-purple scales. (Tab. LXXXVIII. A.) Aspidotis Californica, *Nutt. MSS. in Herb. nostr.* Cheilanthes Coulteri, *Harv. MSS. n.* 820, *in Herb. nostr.*

Hab. Sa. Barbara, California, *Nuttall, Dr. Coulter.*—I have just alluded to the peculiar habit and general appearance of *H. Schimperi*. Our present species, though from a widely different part of the globe, must rank close to that; and Mr. Nuttall is perhaps not far wrong in considering his species deserving of forming a genus (*Aspidotis*) to which, if adopted, *H. Schimperi* must be added. Our plant has almost the same beautifully cut fronds as *Davallia parvula*, Wall. (Hook. et Grev. Ic. Fil. t. 138). The divisions being all nearly the same in diameter; the ramification may rather be considered pinnatifid than pinnate. Our present species is essentially distinguished by the peculiarly acuminated and spinulose points of the ultimate segments. In *H. Schimperi* the involucres arise from the margin and are directed towards the costa: here from the sinus of a nearly erect, or at most erecto-patent serrature or lacinula, and its direction is thence downward towards the base of the pinnule. Stipes a span long: frond about 3 inches.

(Adiantoidea).

25. H. *Capensis;* caudex creeping scaly copiously root-

ing, stipites sparsely tufted 4—6 inches long slender ebeneous shining scaly with long subulate ferruginous scales only at the base, fronds deltoid membranaceous quite glabrous except a few lax scattered long hairs on the rachises 4 inches long bi- tripinnate, pinnules obovate or oval-oblong rarely oblong decurrent and except some next the main rachis coadunate obscurely crenato-dentate sometimes ciliated rarely pinnatifid, sori copious approximate membranaceous semiovate or lunate jagged or ciliated at the margin. (Tab. LXXVII. C.) — Cheilanthes Capensis, *Sw. Syn. Fil. p.* 128. Ch. prætexta, *Kaulf. En. Fil. p.* 212. Adiantum Capense, *Thunb. Prodr. p.* 173. *Kze. in Linnæa*, x. *p.* 530.

Hab. Cape of Good Hope, *Thunberg, Drège, Ecklon, Zeyher, and others.* Algoa Bay, *Forbes.* — A very distinct species, with a decidedly creeping scaly caudex. The fronds membranaceous conspicuously penniveined, the veins slender forked. The plant dries of an olive-brown colour. We cannot agree with Kunze in placing this in the genus *Adiantum*, though we confess it is not in nature and habit allied to any species of *Hypolepis* or of *Cheilanthes*.

(Fronds with tufted roots, no creeping caudex. Cheilanthoideæ).

26. H. *radiata;* fronds radiate involucrate at the base of the ray, rays lanceolate acuminate pinnate, pinnules horizontal numerous approximate oblong subfalcate auricled at the superior base, sori copious all round the margin and auricle rather small semiorbicular membranaceous, stipites tufted (from a short thick rooting scaly caudex) exactly terete ebeneous, rachises ebeneous grooved above. (Tab. XCI. A.) — Adiantum radiatum, *Linn. Sp. Pl. p.* 1536. *Sw. Syn. Fil. p.* 121. *Willd. Sp. Pl.* v. *p.* 437. *Plum. Fil. t.* 100.

Hab. Tropical America, abundant; West Indian Islands, Brazil, Columbia, central America, Mexico, Peru: from various collectors. — Extremely variable in size, but very constant to its characters: our smallest specimens are from Peru, Chacapoyas (*Mathews*), and Maynas (*Poeppig*): numerous specimens from 4 inches to a span high: our largest are from Guatemala (*Mr. Skinner*), 2—3 feet long, with fronds 24—26 inches in the spread of the rays. All authors have hitherto placed this plant in *Adiantum:* — Mr. Brown has, a quarter of a century ago, marked the Banksian specimens as belonging to *Cheilanthes:* and Mr. J. Smith, in his 'Genera of Ferns,' under *Adiantum*, observes that "the species of that genus with reniform indusia are distinguished from *Cheilanthes* with a similar indusium, not only by the indusium being sporangiferous, but also by the indusium being produced on the converging apices of two or more venules, whereas the sori of *Cheilanthes* are seated on the apices of single venules, which terminate in the axis of the indusium: hence *Adiantum radiatum*, L., is in accordance with that character a true *Cheilanthes.*" — Agreeably to the view I have taken of *Hypolepis* it will rank here, and distinct as it is from other species it has much in common with the following, *H. pedata.*

27. H. *pedata*, Hook.; fronds glabrous small (4—6 inches long) ternately-divided lower lateral divisions unequally bifid (the lowest and shortest one branched pinnate) middle division and superior branch of the lower division bipinnate, pinnules dimidiato-ovate acute obliquely cuneate at the base auricled at the base above, a few of the lower ones of the principal pinnæ subbipinnate or pinnatifid, sori marginal rather small not copious, involucres membranaceous oblong-reniform, stipes elongated (1—1½ foot long) ebeneous glossy as well as the rachis, which is slightly furrowed on the upper side. (TAB. XCII. A.)

Hab. Jamaica, *Purdie*. — This I consider a perfectly new and very distinct species: in some, indeed in many respects, allied to *H. radiatum*, especially in the full dark green colour when dry of the frond, palor beneath, the opacity of the auricled pinnules, the immersed and (except when held up between the eye and a strong light) obsolete veins, the similar lateral involucres, the same ebeneous stipes and rachises. There is even a disposition to be radiate in the ramification; for the two lowest primary pinnæ are nearly opposite, much longer than the rest; and they at the base send out each a divaricating branch (pedate), forming with the terminal or central primary pinna a deeply 5-angled frond. It is an exceedingly pretty plant, and very constant to its characters in all the numerous specimens I possess.

28. H. *spectabilis*, Link; glabrous, fronds 2 feet or more long broad oblong acuminate submembranaceous bright green (when dry) 3-4-pinnate, primary pinnæ deltoideo-acuminate secondary ones lanceolate ultimate ones subdimidiato-oblong sessile decurrent at the base the upper ones confluent, all nearly entire, sori very small not numerous on both margins fewer on the lower very small squamiform nearly white distinct or sometimes confluent, stipes elongated and as well as the rachises ebeneous glossy. (TAB. LXXXVIII. B.) Cheilanthes spectabilis, *Kaulf. En. Fil. p.* 214. Cheil. Brasiliensis, *Raddi, Fil. Bras. p.* 60, *t.* 75, *f.* 2. Hypolepis, *Presl, Tent. Pterid. p.* 166. Aspidium coniifolium, *Pr.*

Hab. Brazil. Common about Rio. Organ Mountains, *Gardner, n.* 198. Pernambuco, *Swainson*. S. Brazil, *Sellow* (*in Herb. nostr.*) Rio Grande, *Mr. Fox* (*Herb. n.* 123). — Raddi's figure above quoted is a fair representation of the entire plant. A common state of the fructification is as represented at our TAB. LXXXVIII. B., while it must be confessed that other specimens exhibit the involucres more or less confluent, and this plant has perhaps as strong a claim to *Cheilanthes* as to *Hypolepis*. Some of my specimens are nearly 4 feet long, including the almost black glossy stipes. I think it ranks better near *H. radiata* and *H. pedata* than with *Cheilanthes*, as I am disposed to consider the limits of the latter genus.

29. H. *paupercula*; laxly tufted, frond ovato-acuminate

5—8 inches long chartaceo-membranaceous pellucid pale green bi- subtripinnate, pinnules distant elliptical approaching to rhomboid very obtuse at the apex and the base petiolulate deciduous, petiolule short intensely black glossy dilated at the apex and inserted a little within the margin beneath, veins and marginal sori few remote, involucre pale membranaceous subrotund rather large, stipes and rachises dark black-purple glossy slender. (Tab. LXXXVIII. C.) Adiantum pauperculum, *Kze. in Schkh. Fil. Suppl.* ii. *p.* 65, *t.* 127. Cassebeera micromera, '*Hort. Berol.*' *Klotzsch, in Herb. nostr.*

Hab. Province of St. Jago, Cuba, *Linden, n.* 1864.—A very remarkable plant, but assuredly rather referrible to *Hypolepis* or *Cheilanthes* than to *Adiantum*. In age the involucres are often seen spread open, yet not bearing the sori. The shape of the pinnules is very constant, and a great peculiarity, noticed though not represented by Kunze, is the dense black short petiolule to each pinnule, which on careful inspection will be found to be attached to the pinnule a little within the margin, and there articulated: from this petiole the pinnule is easily detached, and the petiole remaining on the rachis is seen to be dilated at the top into a small disk, which is the point of attachment. I know not that this curious species has been found anywhere but in Cuba and by Linden. Some of our specimens are tripinnate, as represented by Kunze.

30. H. *Gardneri*, Hook.; tufted small (3 inches high), fronds oblong-lanceolate pinnate glabrous, pinnæ sessile horizontal herbaceous oblong obtuse subfalcate entire or slightly lobed dimidiato-cuneate at the base and auricled at the base above, sori several approximate marginal extending to the auricle, involucres membranaceous between reniform and semiorbicular rather small, stipes very short (scarcely any) and as well as the rachis glossy purple-black ebeneous. (Tab. XCII. B.)

Hab. Side of a narrow ravine on the summit of the Serra de Natividade, Brazil, *Gardner, n.* 3556.—Perfectly distinct from any other *Hypolepis* or *Cheilanthes*, and the fructification is entirely that of the present genus. Notwithstanding the simply pinnated character of the fronds it must naturally, in the habit and texture of the fronds, auricled pinnæ, and in the position and arrangement of the sori, and in the ebeneous stipes and rachis rank with the two preceding. The roots are tufted, very fibrous. As in *H. radiata* and *H. pedata*, the venation is not visible (save in the young pinnæ) unless held up between the eye and the light, it will then be seen to be pinnated, and that the sorus originates from a single vein. I have seen no other specimens but those of Mr. Gardner above referred to.

Dubious Species.

Hypolepis *Sellowiana*, Klotzsch, in Hook. Herb., does not appear to possess an involucre, on which account I do not describe it here. It is a Brazilian plant, and I know not if Dr. Klotzsch has anywhere published it.

4. CHEILANTHES, *Sw.*

(HOOK. GEN. FIL. TAB. CVI. B.) Cheilanthis Sp., *Sw. et Auct.* Adianti, Allosori, Pteridis, Cassebeeræ, Notholenæ, Hypolepidis Sp., *Auct.*

Sori subglobose, marginal, small, generally upon a lobule or tooth of the margin of the frond which becomes reflexed. *Involucre* usually at first punctiform, semiorbicular or subreniform or oblong, formed of a reflexed tooth or lobule and more or less of the texture of the frond, or membranaceous and diaphanous, entire or jagged or toothed or ciliated, more or less confluent, so as often to be continuous; sometimes its situation is a little intramarginal.—*Tropical or extratropical mostly small* Ferns, *inhabiting dry rocky places, with a tufted* root *or rather short creeping* rhizoma *or* caudex. Fronds *tufted more or less, often densely so, membranaceous, glabrous, or hairy, woolly or more or less scaly, never simple, more or less compound, rarely simply pinnate, bitripinnate or variously pinnatifid,* pinnules *and* segments *generally small, their margins recurved in fructification.* Stipites *and principal* rachises *usually ebeneous (dark purple-black) and glossy.* Veinlets *forked, free, conspicuous or obsolete, their apex bearing a single* sorus.

Vain is the attempt to form any definite character which shall decide the proper limits of this Genus. A glance at the above synonyms will suffice to show the views that different authors entertain respecting it. From *Adiantum* indeed the habit is very different, as well as the position of the sori upon the involucre in *Adiantum;* on the margin of the frond in *Cheilanthes*, (χειλος, margin, and ανθος, a flower). In separating *Hypolepis* from it, I have been induced to refer to that Genus (by no means generally adopted), species which many would retain, and perhaps justly, in *Cheilanthes.* But a much greater difficulty exists in drawing the line of distinction between *Notholena*, on the one hand, and *Pteris* or *Allosorus*, on the other. *Notholena* is characterized by the absence of an involucre; but in the young state of many species the reflexed margin of the pinnule can hardly, if at all, be distinguished from a true involucre: while, in old specimens of some acknowledged species of *Cheilanthes*, the involucre is so forced back by the capsules, and concealed by them, that its presence is not easy to be recognized at all, especially in those species where the involucre is of the same texture as the frond. Then with regard to *Pteris* and *Allosorus*, it is quite certain that where the involucres of *Cheilanthes* are confluent, as is so frequently the case (not so in *true Hypolepis*) and continuous, the fructification to all appearance is that of *Pteris* and *Allosorus.* It is true that in most cases the specimen, in some of the pinnules, does exhibit free and punctiform involucres, (as we have observed of some of the *Hypolepis* genus): but there are numerous other cases of species, referred

to *Cheilanthes*, where all the involucres are continuous. Generally speaking, the less the margins of the pinnules are lobed or divided, the more continuous and Pteroid are the involucres. The difficulties above stated are well and briefly noticed by Presl. "Sori demum confluentes vel subcontinui, aut *Pteridi* aut *Allosoro* subsimiles. In quibusdam *Cheilanthis* speciebus, *e. g.* in *C. microphylla*, *C. odora*, et cæt., indusium tam angustum observatum, ut nonnunquam vix adesse videatur; tales species, si sori confluxi marginem frondis undique occupant, *Notholenæ* simulant." Removing several species of original *Cheilanthes* to *Cassebeera* does not seem to me to lessen the difficulty of defining *Cheilanthes*; and assuredly in natural habit they have nothing to do with the original *Cassebeera*.—I find it vain to attempt to form any well-defined groupes of the species of *Cheilanthes*. The ramification is very variable on the same or different specimens of a species: and those four groupes here given must be accepted as merely provisional.

(Fronds simply pinnate).

1. Ch. *micropteris*, Sw.; small, everywhere clothed with glandular hairs, caudex horizontal scaly, roots cæspitose wiry fibrous, stipites short densely crowded from one point cheneous glossy copiously rufo-paleaceous at the base, fronds linear 3—4 inches long pinnated, pinnæ alternate ovate or subrotund crenate at the base obscurely toothed or lobate convex on the upper surface, involucres formed of the margin of the lobes 3—5 on each pinnule often confluent convex much inflected. — *Sw. Syn. Fil. pp.* 126 *et* 324, *t.* 3, *f.* 5. *Willd. Sp. Pl.* v. *p.* 455.

Hab. Pelileo, Quito, (*Swartz*). Brazil, *Sellow*, (*Klotzsch, in Herb. nostr.*) Sierra do Tondil, Argentine republic, *Tweedie*. — It would be a great boon to the students of Ferns, if the species of Ferns were in general as distinct as the one now under consideration. It is from a finger's length to scarcely a span high, the stipites densely tufted upon a short thick horizontal scaly caudex, which sends down numerous wiry fibrous roots. The short stipes and simply pinnated frond as well as the rachis are glandularly hairy: the pinnules are small, generally deflexed, convex, crenated or lobate, the teeth or lobes of the crenatures are recurved upon the under surface of the frond and constitute the involucres. Cavanilles is perhaps the first botanist who was acquainted with this species, and he sent it to Swartz under the MSS. name of *Pteris microphylla*. It appears to be a rare species. Notwithstanding that it is said to be a native of Quito, and that I possess many excellent collections of plants from thence, I have never received this from that quarter. My only specimens were gathered by Sellow in (South) Brazil, and in the Argentine provinces by Tweedie.

(Pinnæ or pinnules large for the Genus, broad; white and powdery beneath).

2. Ch. *argentea*; small glabrous glossy brown a little scaly below, caudex short thick creeping, stipites tufted, frond cordately 5-angled tripartite white and pulverulent beneath,

each of the three primary divisions pinnatifid, at their base bipinnatifid, the margin crenated, involucres membranaceous brown confluent transversely waved and crenated. *Kze. in Linnæa*, 1850, *p.* 242. Pteris argentea, *Gmel. in Nova Acta Petrop.* xii. *t.* 12, *f.* 2. *Swartz, Syn. Fil. p.* 105 (*not Br.*) *Langsd. et Fisch. Plantes des Voy. Russ., Fil. p.* 19, *t.* 22. Allosorus, *Presl.* Cassebeera, *J. Sm.* Pteris pedata, *var. Linn.*

Hab. Siberia, *Gmelin;* in the fissures of rocks, near the river Katunja Altai, *Ledebour.* Besides from Altai, I possess specimens of this rare and elegant little Fern from Kamtschatka (*Herb. Besser*), from Dahuria (*Fischer*), and from Lake Baikal (*Turczaninow*).—This has the look of a tropical species, with its white powdery surface beneath, and possesses a form so much resembling the West-Indian *Pteris* (Allosorus) *pedata*, Linn., that Linnæus considered it a variety of that species, and published it as such, with the observation, "planta Sibirica minor et subtus nivea, margine ferrugineo." It will be seen by the synonyms what conflicting opinions there are respecting the proper genus of this plant. It ranks naturally near *Ch. farinosa;* but the involucres are always continuous, as in *Pteris* or *Allosorus*, but waved and crenated.

3. Ch. *farinosa*, Kaulf.; roots tufted, stipites more or less elongated ebeneous glossy deciduously scaly, fronds subcoriaceous from a span to a foot long deltoidly lanceolate or lanceolate glabrous white and powdery beneath pinnate the apex pinnatifid acuminate, pinnæ mostly lanceolate pinnatifid the one or two lowermost pair more or less half deltoid bipinnatifid below, involucres brown scariose rounded sometimes confluent and then waved and lobed, the margin entire or toothed and jagged. *Kaulf. Enum. Fil. p.* 212. *Hook. et Grev. Ic. Fil. t.* 134, *excl. Syn. Reliq. Hœnk.* (involucres small entire). Pteris farinosa, *Försk. Fl. Ægypt. Arab. p.* 187. *Vahl, Symb.* iii. *t.* 75. *Swartz, Syn. Fil. p.* 105. Ch. dealbata, *Don, Prodr. Fl. Nep. p.* 16. *Wall. Cat. n.* 71, (*excl. subnum.* 4). *Schimp. in Herb. It. Abyss. n.* 1123. *Kunze, in Linnæa*, xxiv. *p.* 271. Pteris argyrophylla, *Sw. Syn. Fil. p.* 105. Pt. argentea, *Bory.* Pt. decursiva, *Försk. et Sw.* Cassebeera, *J. Sm.* Allosorus, *Presl.* — *β.* powdery substance beneath nearly obsolete and usually pale sulphur colour. — *γ.* small, compact rigid. Ch. rigidula, *Wall. Cat. n.* 2175.

Hab. Arabia, *Förskal.* Abyssinia, near Ser Acaba, *Schimper.* East Indies, plentiful. Nepal and Simla and adjacent region, *Edgeworth, Wallich, Lady Dalhousie.* Mussouree and Nynee Tab, *Dr. T. Thomson.* Almora, 5,000 feet of elevation, *Messrs. Strachey and Winterbottom.* Scinde, *Dr. J. E. Stocks.* Madras Peninsula, *Dr. Wight, n.* 137 *and* 138. Assam and Khasya, *Griffith, T. Lobb.* Neilgherries, *T. Lobb, Sir F. Adam.*

Bourbon, *Bory*. Ceylon, *Gardner, n.* 1168, *Mrs. Genl. Walker*. Phillipine Islands, *Cuming, n.* 235. Java, *Zollinger*.—*β.* Oaxaca, Mexico, *Galeotti, n.* 6551. Bombay and other localities, often growing with var. *a*.—*γ.* Bundydroag, Madras, *Dr. Wight*.—We had two if not more grounds for adopting the specific name of "*farinosa*" for this plant in the 'Icones Filicum,' and not *dealbata* of Mr. G. Don. 1. We believed it to be identical with the *Pteris farinosa* of Förskall: and, 2. There already existed a *Ch. dealbata* of Pursh, a N.-American plant. It is true that Pursh's *dealbata* has been more recently referred to *Notholena*, and Kunze has, in his "Notes on some Ferns of the United States" in 'Silliman's Journal' (July, 1848), said, "I would not have looked for this plant under *Cheilanthes;*"—yet we think *Notholena* treads too closely upon the heels of *Cheilanthes* to make it desirable to increase unnecessarily the number of specific names common to both. In regard to the identity of our *Ch. farinosa* and the *Pteris farinosa*, published in 1775, of Förskal, it is probable that authors differ from us on that ground rather in consequence of the locality (Egypt) than from any positively distinct character traceable in Förskal's description or Vahl's figure: few probably have seen authentic specimens. Kunze however observes ('Linnæa,' xxiv. p. 274), "*Cheilanthes* (Pteris, *Försk.*) *farinosa*, Kaulf.—non Hook. et Grev.—ipso b. auctore in recensione operis laudati jam testante, ab hac nostra differt et adhuc tantum in Arabia et Abyssinia (coll. Schimperiana sub n. 1123) reperta est. Differre imprimis videtur pinnis remotioribus, indusiis contiguis et indumento pulveraceo tenuiore."—We have no access to Kaulfuss' Egyptiaco-Arabian specimen; but we have before us Schimper's Abyssinian species, n. 1123, and we have no hesitation in saying that it is identical with the ordinary East Indian forms above noted. If then Abyssinia and Arabia be considered its western boundary, it may be traced thence easterly, almost uninterruptedly to Java and the Phillipine islands. Species growing in so vast a range may be expected to vary considerably. The same root, from Abyssinia, of Mr. Schimper, has one frond quite white and pulverulent beneath, and another frond with only a faint trace of powdery substance: and this makes it doubtful if our following species (*Ch. rufa*) should be retained as such. No less striking differences occur in the involucres, sometimes rounded and distinct, at other times continuous for a great length of the margin, more or less lobed and cut (rarely entire), and more or less toothed or ciliated. Our *β.* is never quite destitute of powdery substance: and I have received from Mexico (Galeotti) what I cannot in any way distinguish from it. *γ.* is a small and compact form, with segments closely packed and so narrow that the back of the frond seems all sori.—Some specimens of *Ch. farinosa* from Mishmee and Assam have scattered scales all the way up the rachis beneath.

4. Ch. *pulveracea*, Pr.; "fronds triangular-oblong glabrous bipinnatifid, pinnæ subopposite sessile deeply pinnatifid, laciniæ linear-oblong obtuse sinuato-dentate white and farinose beneath, the lower external laciniæ the longest, involucres squamæform, stipes paleaceous at the base." *Presl, Reliq. Hænk.* i. *p.* 64, *(excl. syn.)* Ch. candida, *Mart. et Galeotti, Fil. p.* 73, *t.* 20, *f.* 1, *("excl. f.* 1, *a.") Kunze, in Linnæa*, xviii. *p.* 638. Allosorus pulveraceus, *Presl, Tent. Pterid. p.* 153.

Hab. Mexico, *Hœnke.* Rio Grande de Lerma, *Galeotti, n.* 6442. On rocks and walls in the temperate regions of Mexico, *Siebold, in Herb. nostr.* —To this plant Presl brings as synonymes the *Pteris argyrophylla*, Willd., and *Pt. argentea*, Bory, "fide plantæ Boryanæ in Herb. Willd.," which are the same as our *Ch. farinosa*, (Pteris, *Försk.*) Martens and Galeotti, ignorant of Presl's name for it, figure and describe it (not very satisfactorily) under that of *Ch. candida*, and they add the remark, "species proxima *Ch. farinosæ*, Hook. et Grev., sed in hac pinnæ nec pinnatæ nec profundè pinnatifidæ." We have never seen the ordinary state of *Ch. farinosa*, with the copious pure white purverulent substance beneath, from Mexico: but Mr. J. Smith and myself possess from Galeotti (Oaxaca, n. 6551) what exactly corresponds with our var. β. of *Ch. farinosa:* so that there is good reason to believe that that species and its varieties may be found in the New as well as the Old World. Kunze does not allow that the "fig. 1, *a*," belongs to Martens and Galeotti's plant: but it is probably as faithful as most of the other magnified figures of those authors. Presl, in his 'Reliquiæ Hænkeanæ,' observes of this plant, "Habitus *Pteridis*, sed pro specie *Pteridis* non agnosco, quia indusium non continuum sed squamæforme, et tot quantum sori:" yet in his 'Tentamen Pteridilogiæ' he refers it to *Pteris* (Allosorus). Kunze contends for its being a true *Cheilanthes*. The fact is, the involucres resemble those of other species of this genus in being sometimes squamæform and distinct: sometimes combined and continuous.

5. Ch. *rufa*, Don; roots tufted, stipites rather short with few spreading scales and shaggy as is the whole rachis with very copious spreading ferruginous hairs, fronds about a span long ovato-lanceolate subcoriaceous hirsuto-pubescent above, white and pulverulent beneath, the margin densely ferrugineo-hirsute pinnate pinnatifid at the apex, pinnæ oblong very obtuse pinnatifid, the lower ones subovate sub-bipinnatifid, involucres dark brown membranaceous approximate and free or continuous and waved and crisped or lobed and toothed at the margin often quite concealed by the copious ferruginous tomentose shaggy hairs. *Don, Prodr. Fl. Nep. p.* 18. (TAB. XCIX. A.) Ch. farinosa, *var.* vestita, *Wall. Cat. n.* 71, (4).

Hab. Mareko, Nepal, *Dr. Wallich.* Rocks, Mergui, Mishmee and Khasya, *Griffith.* Simla, *Edgeworth.*—In none of the numerous states of *Ch. farinosa*, do I find anything approaching to hairiness: in the present plant, from four different localities, the shaggy copious ferruginous hair, long spreading on the stipes and main rachis, quite crisped and woolly at the margin of the frond, is quite a remarkable feature. The fronds, too, are less divided, in the lower pinnæ especially, but on this character very little dependance can be placed. In other respects, and especially in the white pulverulent under surface (though often quite concealed by the hairiness) the plant resembles some states of *Ch. farinosa.*— Here are, at any rate, tangible characters, if constant. Original specimens, given by Mr. Don to Mr. J. Smith, show this to be intended for his *Ch. rufa*.

(Pinnæ or pinnules large for the Genus, broad; not white or pulverulent nor scaly beneath).

6. Ch. *Dalhousiæ*, Hook.; roots tufted, stipites rather short ebeneous glossy deciduously scaly, fronds about a span long deltoidly lanceolate glabrous on both sides and perfectly free from powdery substance beneath pinnate the apex deeply pinnatifid and acuminate, pinnæ upper ones lanceolate pinnatifid, the rest broader and bipinnatifid, lowest pair very broad at the base with their lowest inferior segments (or pinnules) much longer than the rest, the margin crenated sometimes in the barren portions ciliated, involucres brown scariose reniform close but generally distinct sometimes confluent and then less ciliated but lobed and jagged. (Tab. LXXVIII. B.)

Hab. Simla, *Lady Dalhousie*, *Mr. Edgeworth*. Mokargari, Kumaon 4500 feet of elevation, *Messrs. Strachey and Winterbottom*.—Did I possess only a solitary specimen of this, or were the specimens any of them mixed up with *Ch. farinosa*, I should have been disposed to consider it a powderless variety of that species: but there is not a trace upon any of my specimens of that pulverulent substance seen more or less copiously upon all true *farinosa*, and these have been found by three different persons at different periods, yet only in two localities. I venture therefore to offer it as distinct. Its fronds are of a thin membranaceous texture, turning pale olive-brown in drying, and the fructifications present nearly the same variations in the involucre that we see in *Ch. farinosa*. It naturally ranks with that species, though here artificially placed in another section.

7. Ch. *pteroides*, Sw.; caudex thick creeping scaly, stipes 1—2 feet long and as well as the rachises (which are woolly at their axils with slender scales) stout ebeneous glossy, frond ample glabrous 1—1½ foot long tripinnate, pinnæ and pinnules distant, the latter petiolulate often an inch long cordate elliptical obtuse crenate opaque brown when dry, involucres copious contiguous yet distinct subrotund membranous brown extending over the whole margin.—(Tab. CI. A.) *Sw. Syn. Fil. p.* 128. *Willd. Sp. Pl.* v. *p.* 455. *Blume, Fil. Jav. p.* 136. Adiantum, *Linn.*, *Thunb.* Cassebeera, *Presl, Tent. Pterid. p.* 155, *t.* 6, *f.* 7. Pteris orbiculata, *Houtt.*

Hab. Cape of Good Hope, abundant, in rocky mountainous places, from 1000—3000 feet of elevation. Summit of Mount Gede, Java, *Blume*.—We have here a Fern very distinct from any other *Cheilanthes*, so distinct, that it needs no elaborate description for distinguishing it; with the true involucres, indeed, of that genus, but with the habit altogether of certain species of *Pteris* or *Allosorus* common at the Cape. The plant has consequently vacillated between *Adiantum* and *Pteris* and *Cassebeera* and *Cheilanthes*, according to the views of respective authors.—An authentic specimen of the Java plant, from Dr. Blume, shows that that is identical with the Cape plant, as are the *Ch. multifida* and *hirta* of Java with those respective plants of South Africa.

(Pinnæ and pinnules as in the preceding group, but densely clothed with imbricated scales).

8. Ch. *squamosa*, Gill.; roots tufted, stipites 1—2 inches long and as well as the general and partial rachis and costa and pinnules beneath densely clothed with and concealed by the copious large ovate acuminate ciliated membranaceous ferruginous scales, fronds 4—5 inches long ovato-lanceolate bipinnate subcoriaceous glabrous and naked above (fringed with the scales beneath), pinnules large oblong sinuato-lobate, involucres submembranaceous narrow continuous. *Gill. in Hook. et Grev. Ic. Fil. tab.* 151.

Hab. Rocks, Cerro del Morro, San Luis, Argentine Republic, *Dr. Gillies.*—A most distinct and well-marked species, which, as far as we know, has never been detected by any botanist save Dr. Gillies. It has no natural affinity with the preceding broad-pinnuled species, nor has it any with the scaly species allied to *Ch. lendigera.*

(Fronds generally decompound, the pinnules small, glabrous or hairy or scaly.—Eucheilanthes).

9. Ch. *fragrans*, Webb et Bert.; small, roots cæspitose, stipites short glossy deep brown bristly with deciduous subulate ferruginous scales, fronds glabrous ovato-lanceolate bipinnate or at the base subtripinnate, primary pinnæ broad-ovate lower ones distant, pinnules (fructiferous) convex on both sides oblong or ovate crenato-lobate, involucres copious small approximate one or more on each lobule their margin toothed or crenate pale and membranaceous often confluent. — *Webb et Berth. Phytogr. Canar. p.* 453 (non Sw.) — Polypodium fragrans, *Linn. Mant.* 2, *p.* 307, (non Sp. Pl. p. 1550). *Desf. Fl. Atl.* ii. *p.* 408, *t.* 257. Pteris acrosticha, *Balb.*—Pteris fragrans, *Lag.*—Adiantum fragrans, *Viv.* Cheilanthes odora, *Sw. Syn. Fil. p.* 127 *et* 327. *Schkuhr, Fil. p.* 115, *t.* 123. Ch. suaveolens, *Sw. Syn. Fil. p.* 127. *Schkuhr, Fil. p.* 116, *tab.* 19, (Adiantum fragrans, on the plate). *Sibth. Fl. Græc. t.* 966. Ch. Maderensis, *Lowe, Nov. Fl. Mad. p.* 6.

Hab. Rocky places throughout the region of the Mediterranean. "Cives est hæc planta" says Mr. Webb, "oræ utriusque sinus ingentis Mediterranei, a Syria (*Labillardière*) ad Hispaniam, unde per Lusitaniam et Maderam Fortunatas attingit." Switzerland is perhaps its most northern locality. Dr. Alexander finds it in Dalmatia. We have to add one very distant locality, viz., Affghanistan, *Mr. Griffith*, n. 13, in herb. nostr.—The student of Ferns is much indebted to Messrs. Webb and Berthelot for determining the proper name and settling the synonymy of this species in their noble work on the Canary-island plants. They observe, "Linnæus plantam nostram sub nomine *Polypodii fragrantis* (Mant. nov. Sp. Plant.), quam secum a Gallia communicavit doctus monachus Gabriel (cui *Sco-*

lopendra Gabrielis, Syst. Nat. vol. i. p. 1063 dicata) optime descripsit. Confusio et specierum perturbationes cum Swartzio, quod rarum, ortæ, qui nomina duo diversa plantæ Linnæanæ, Linnæanum alteri Indicæ, nisi forsan eadem, indidit; planta enim valde polymorpha; utcunque autem erit *Cheilanthi* (Polypodio, *Linn.*) *fragranti* veræ restituendum nomen suum et Swartziana, dum legitima, *Cheilanthes Swartzii* vocanda."—Polymorphous as this species is, it is much less so than most species of the Genus or of the Family: and we can refer to the figures of Schkuhr, both his tab. 19 and 123 (though he considered the two plants as distinct), and to Sibthorpe, and Desfontaines, for faithful representations of the entire plant: but the fructification is nowhere well exhibited. Irregular as is the form of the involucres, and however these may be distinct or combined, it will be observed that while their lower portion or base is evidently formed of the inflexed margin of the frond, green and herbaceous, the rest is a pale membranous dilatation as it were of it.

10. Ch. *tenuifolia*, Sw.; caudex short creeping scaly, stipes elongated rarely scaly, frond submembranaceous glabrous 3—4 inches to a span and more long ovate acuminate or more or less deltoid subtripinnate, ultimate lobes of the primary and secondary divisions the largest more or less pinnatifid, pinnules elliptic oblong or oblong-lanceolate subpinnatifid or crenate with broad blunt teeth, involucres mostly elongated more or less confluent more or less crenated or denticulate sometimes transversely wrinkled, stipes and rachis purple-black, main rachis winged above, secondary and tertiary rachises all with a narrow wing. (Tab. LXXXVII. C.) — *Sw. Syn. Fil. p.* 129 *et* 332. *Schkuhr, Fil. p.* 117, *t.* 125. *Willd. Sp. Pl.* v. *p.* 460. *Br. Prodr. p.* 155. C. rupestris, *Wall. Cat. n.* 67. C. micrantha, *Wall. Cat. n.* 68. Aspidium tenue, *Retz, Obs.* vi. *p.* 39. Pteris humilis, *Forst. Prodr. n.* 421? Trichomanes tenuifolia, *Burm. Ind. p.* 237. Dryopteris campestris, &c., *Rumph. Amb.* vi. *p.* 77, *t.* 34, *f.* 2.

Hab. East Indies (*Swartz*), more especially in the hilly eastern provinces of Bengal. Pundooh Mountains, Sylhet, Tavoy, *Dr. Wallich.* Moulmain and throughout Khasya and Assam, *Griffith, Mrs. Mack.* Madras Peninsula, *Dr. Wight*, (*n.* 136). Mangalor, (*Herb. Hohenacker, n.* 666). Ceylon, *Gardner, n.* 1257, *Mrs. Genl. Walker, Major Champion.* Malay Islands and Peninsula, frequent. Sincapore, *Sir W. Norris, Seemann, n.* 2304, *Dr. Wallich.* Malacca, *Griffith.* Penang, *Lady Dalhousie.* Java, *Blume, Zollinger, Thos. Lobb.* Phillipine Islands, *Cuming, n.* 281. China, *Swartz, Beechey.* N. Holland, Port Jackson and the Tropics, *Brown, Fraser.* Swan River, *Drummond.* Van Diemen's Land, *Mr. Lawrence, Mr. R. Gunn.* New Zealand, Banks' Peninsula, *Dr. Lyall.* Sunk Island, *Mr. MacGillivray.* — A widely distributed *oriental* species of *Cheilanthes*, both in the northern and southern hemisphere, variable in size and outline, but very constant in the general ramification and form of the pinnules, although these latter naturally differ much in form in different parts even of the same plant. Our finest and most perfect specimens are those of Mr. Thos.

Lobb, from Java and Sincapore: and our figure above quoted will give a better idea of the plant than whole pages of description can do.

11. Ch. *Preissiana*, Kze.; "frond coriaceous glabrous short-oblong bipinnato-pinnatifid or tripinnate, pinnæ triangular-oblong inferior ones ascending remote, pinnules or laciniæ from a cuneate base ovate (in young cultivated fronds trapezio-ovate) rather obtuse incised or pinnatifid, sori subcontinuous, involucres at length inciso-laciniate, rachises flexuose and as well as the longish stipes purple-ebeneous paleaceo-villous, rhizoma short horizontal fusco-paleaceous." *Kunze, in Pl. Preiss.* ii. *p.* 112.

Hab. Rocky places, York district, Swan River, *Herb. Preiss. n.* 1308. Island of Bouron, *Labillardière*. New Zealand, *Lesson*.—"Antea," says Kunze, *l. c.*, "hanc plantam *Cheilanthis ambiguæ*, Rich. (Voy. de l'Astrol. Bot. i. p. 83) credidi; sed nunc filicem eandem Lessonianam, quam ex amicæ manu Mérattii acceperam, a Richardo neglectam, et *Ch. ambiguam* vix veram generis speciem esse vero similius mihi videtur. Hanc nondum vidi. Nostra habitu *Ch. tenuifoliæ*, Sw., haud absimilis; differt rachibus pilosis, stipite longiori et soris continuis." *Kze. l. c.*—I regret to say that rich as is my herbarium in Swan River Ferns, and in those from New Zealand, I do not find any that I can satisfactorily refer to Kunze's *Ch. Preissiana*. The *Cheilanthes ambigua*, Rich., I have had reason to suppose might be possibly *Hypolepis tenuifolia*, Bernhardi, and of this work, or else a *Polypodium* with the habit of *Hypolepis* (Pol. viscosum, *Spreng.* — P. rugulosum, *Br.* ?). The comparisons drawn by Kunze make it more difficult to comprehend the species in question.

12. Ch. *Sieberi*, Kze.; caudex creeping setaceo-paleaceous, stipites 2—6 inches long and as well as the rachises ebeneous, fronds quite glabrous subcoriaceous linear-oblong erect rigid bi-tripinnate, primary ones short pointing upwards lower ones petiolate subtriangular acuminate, pinnules oblong decurrent lower ones inciso-pinnatifid upper ones entire or sinuated the margins much recurved especially when dry, sori punctiform and semiorbicular or more or less combined and continuous, the edge pale and membranaceous toothed. (Tab. XCVII. B.) *Kunze, Ind. Sem. Hort. Lips. an.* 1839, *et in Plant. Preiss.* ii. *p.* 112. Ch. tenuifolia, *Sieb. Syn. Fil. n.* 116. *Fl. Mixt. n.* 250. *Link, Fil. Sp. Hort. Berol. p.* 64, *(excl. syn.)*

Hab. N. Holland; Sydney, *Sieber*, *Fraser*. Subtropical interior, *Col. Mitchell*. Endeavour River, *Allan Cunningham*. Swan River, *Drummond*, *Preiss*.—New Zealand, northern island, *Mr. Colenso*, *J. D. Hooker*, *Dr. Logan*. Middle island, Akaroa, *Raoul*. Houraki Gulf, *Dr. Lyall*.—I retain this, with much hesitation, as a species distinct from *Ch. tenuifolia*: true indeed there are some specimens which in the narrow fronds and erect rigid habit are much at variance with the ordinary form of *tenuifolia*;

but then there are intermediate forms which seem to combine them. I cannot agree with Kunze in saying of it, "a *Ch. tenuifolia*, Sw., abunde differt *fronde membranacea:*" for our specimens are, except those in a very young state, more rigid. That author also notices its affinity with *Ch. rupestris*, Wall.,—which latter is true *tenuifolia*.

13. Ch. *microphylla*, Sw.; caudex subrepent, stipes rather short and rachises deciduously ferrugineo-pubescent or hirsute, fronds lanceolate pubescent or glabrous elongate lanceolate bi- rarely subtripinnate, pinnæ lanceolate, pinnules oblong obtuse entire or more or less crenate or pinnatifid, involucres copious rounded or elongated frequently much confluent.—*Sw. Syn. Fil. p.* 127. *Willd. Sp. Pl.* v. *p.* 458. Ch. micromera, *Link, Hort. Berol.* ii. *p.* 36. *Link, Sp. Fil. Hort. Berol. p.* 64, *(fide Kze.)* Ch. pubescens, *H. B. K. (fide Schlecht.)* Cassebeera, *J. Sm.* Adiantum microphyllum, *Sw. Fil. Ind. Occ.* iii. *p.* 1713. Adiantum nigrum, &c., *Sloane, Jam. Hist.* i. *p.* 93, *t.* 13, *f.* 2. Lonchitis minima, &c., *Plum. Fil. p.* 44, *t.* 58.

Hab. West Indian Islands generally, (*Swartz*). Jamaica, abundant, *M'Fadyen, Hartweg, n.* 1581, *Wilson, Purdie.* Cuba, *B. D. Greene, Esq.* Mexico, *Karwinski, Galeotti, n.* 6557, *and* 6564, *Dr. Coulter* (Rio del Monte, small, pinnules few, broad, *n.* 1678). Sierra Madre, N.W. Mexico, *Seemann, n.* 1931. New Mexico, El Paso, *C. Wright, n.* 823, *(small).* Columbia, *Moritz.* Venezuela, *Linden, n.* 842. Peru, *Mathews, n.* 3297. Valley of the Andes of Peru, 6000 feet, *Dr Jameson.* Punta of St. Elena, Salto and Panama, *Tweedie.*—To say that this is a variable species, is only what may be said of almost all Ferns: and I do not see that any the most minute description can meet the difficulties of the case: for they rather tend to confuse and to mislead. The general form of the frond is tolerably well expressed in Plumier, though on his usually exaggerated scale: but there are some states that bring our species into near relationship with *Ch. tenuifolia:* our largest specimens on the other hand have an affinity with some states of *Hypolepis spectabilis.* The involucres are particularly variable, sometimes short and orbicular, at other times linear and continuous, approaching, as so many of these plants do, to *Allosorus:*—this depends doubtless much on the entireness or indentation of the pinnules. Our El Paso specimens from Mr. C. Wright, are small, quite glabrous (not from age), and the caudex is decidedly creeping. They may prove a different species. Galeotti's *n.* 6564, though rather small, has the pinnules larger than usual. Mr. Seemann's from Sierra Madre, has some fronds with the involucres continuous; others with the sori all small and distinct.

14. Ch. *Tweediana*, Hook.; caudex a good deal creeping horizontally, clothed with subulate brown bristly scales, stipites scattered on the caudex short in proportion to the frond slender ebeneous a little scaly towards the base, fronds quite glabrous a span to a foot or 1½ foot long linear-oblong bipinnate, pinnæ short distant oblong or ovate, pinnules membra-

naceous dark green distant oblong but subcordate at the base and the lower ones shortly stipitate (only 2 or 3 of the terminal ones decurrent and confluent) lobato-pinnatifid or crenato-lobate the lobes soriferous, involucres semiorbicular 1—3 on each lobe more or less combined their edges pale submembranaceous crenate. (Tab. XCVI. B.)

Hab. River Parana, S. Brazil, *Tweedie.*—I cannot refer this to any described species. In habit it approaches very small specimens of our *Hypolepis spectabilis*, and might perhaps have been placed near it in the same questionable genus; in some repects also to states of *Ch. microphylla* :— but the ramification is much more simple and uniform. Our tallest specimen (and it is only a *part* of a frond, 17 inches long) is not broader than our specimens which are less than a span long, and all are alike bipinnate. The lower pinnules are shortly petiolate or stipitate. The caudex creeps considerably, and is scarcely thicker than a crow-quill. — I have received this plant only from Mr. Tweedie.

15. Ch. *Seemanni*, Hook.; roots tufted, stipites 3—6 inches in length scaly below with black subulate scales and as well as the general and partial rachis ebeneous-purple, fronds glabrous submembranaceous dark green about equal in length to the stipes oblong-lanceolate bipinnate, primary pinnæ rather distant oblong acuminate patent, pinnules often quite opposite horizontally patent oblong sessile and decurrent so as to form a narrow wing on the rachis lobato-pinnatifid, lobes or segments equal in size generally one or two more on the upper margin, all soriferous, involucres one on each lobe semiorbicular membranaceous pale brown all free and distinct. (Tab. XCVII. A.)

Hab. Sierra Madre, N.W. Mexico, *Seemann* :—came mixed with *n.* 1931 (*Ch. microphylla*, Sw.) — At first sight this resembles *Ch. Tweediana*, but the pinnæ will be found very different, and the deep segments or lobules of the pinnules, more in number on the upper margin than on the lower; each lobule bears a distinct sorus at its apex, covered while young with a semiorbicular membranaceous and diaphanous involucre. Although mixed with *Ch. microphylla*, there is no difficulty in separating the one from the other.

16. Ch. *Moritziana*, Kze.; stipes 5—6 inches long ebeneous glossy ferrugineo-paleaceous at the base, frond ovato-lanceolate acuminate a span to 10 inches long firm rigid yet somewhat membranaceous dark green glabrous 3—4-pinnate or tripinnato-pinnatifid, the ultimate pinnules oblong-cuneate slightly lobed or toothed, partial and universal rachises pubescenti-scabrous, involucres small generally formed of the involute apex of a single lobe rarely subconfluent. (Tab. XCIX. B.) *Kze. in Linnæa*, 1850. *p.* 244 *et* 307. C. elongata, *Kl. MSS.*

et Pl. Exsicc. (not Willd.) C. microphylla, *Klotzsch, in Linnæa*, xx. *p.* 337, *(excl. syn.* C. Klotzschiana, *Kze, quæ* Gymnogramma flexicaulis, *Kl.) Kze.*

Hab. Venezuela, and in Mexico, *Schiede, n.* 800.— Our figure and specific character are taken from specimens kindly sent to us by Dr. Sonder, gathered at La Guayra by Moritz, (*Coll. III. n.* 263). It is a very elegant and we believe very distinct species, better deserving the name of *microphylla* than the *Ch. microphylla*, Sw., with which it has been compared, and which Kunze says differs "fronde basi haud dilatata, semper bipinnata, pinnis ultimis majoribus, rachi primaria valida stipiteque brevi dense rufo-paleaceis." To us its nearest affinity seems to be *Ch. tenuifolia;* but it is much more delicate in all its parts: the primary pinnæ are more numerous, more approximate, and the ultimate pinnules and lobes are more cuneate at their base. Our figures will show the differences better than words can do.

17. Ch. *elongata.* Willd. Herb.; "fronds bipinnate, lower pinnules sinuato-pinnatifid obtuse glabrous, indusium obsolete subcontinuous." *Kaulf. En. p.* 213, *(not Kl. MSS.)* C. Linkiana, *Kze.* C. microphylla, *Lk. (not Sw.) Kunze, in Linnæa*, xxiii. *p.* 213.

Hab. W. Indies, Hispaniola, (*Kaulf.*) — "Sori contiguous confluent. Involucres obsolete, sub-continuous and ciliated."—Such is all the description we have of Willdenow's *Ch. elongata.* But from some of Kunze's references I judge it may be placed near *Ch. Moritziana*, Kze.

18. Ch. *obtusata*, Pr.; "fronds oblong glabrous bipinnatifid, pinnæ sessile subopposite oblong-lanceolate obtuse deeply pinnatifid, laciniæ ovato-oblong obtuse, lower ones inciso-crenate, involucres dentiform, rachis and costæ villous beneath, stipes flexuose, caudex creeping paleaceo-villous." *Presl, Reliq. Hænk. p.* 6, *t.* 11, *f.* 1. *Tent. Pterid. p.* 160.

Hab. Mountains of Peru, *Hænke.*—"Ab affini *Ch. microphylla*, Sw., differt fronde bipinnatifida, laciniis infimis inciso-crenatis, rhachi costaque villosis, caudice repente villoso." I have seen no *Cheilanthes* like this from the Peruvian Andes. The figure shows no analysis, and nothing is said of the fructification.

19. Ch. *crenata*, Kze.; "frond linear-oblong pinnato-pinnatifid glandulosely hairy, pinnæ subopposite sessile ovato-oblong, segments ovate or shortly oblong truncate ultimate ones confluent crenate subincised, involucres at length obsolete, rachis pale and as well as the stipes short brown and paleaceous at the base glandularly rough." *Kunze, in Linnæa*, ix. *p.* 84.

Hab. Rocky places, Huanuco, Peru, elevation 6,200 feet, *Poeppig.* — "*Cheilanthis* species fallax, in juniori planta recognescenda. Specimina

adultiora ob indusia spuria fere explanata *Polypodii* characteres præ se ferunt." — I place this, with which I am unacquainted, near *Ch. obtusata*, Presl, in consequence of the following additional remark of Kunze. "Magnitudo et habitu fere *Ch. obtusatæ*, Pr., quæ vero nostra differt, laciniis crenato-incisis et indumento glanduloso." — In another place Kunze speaks of his *Ch. crenata* as synonymous with *Ch. elegans*, when he says ('Linnæa,' xxiv. p. 275), under *Ch. bullata*, "habitu fere *Ch. elegantis*, Desv., s. *crenatæ* meæ."

20. Ch. *Wrightii*, Hook.; small nearly glabrous, caudex creeping branched scaly about as thick as a crow-quill, stipites rather distant 2—3 inches long and as well as the main rachis brown-ebeneous grooved on one side sparsely hairy with slender spreading hairs, frond about equal in length with the stipes bi- scarcely tripinnate quite glabrous rigid subcoriaceous dark green above pale beneath, primary pinnæ subovate in circumscription rather distant especially the lower pairs which are nearly opposite, pinnules oblong more or less decurrent upper ones confluent pinnatifid with smallish lobes, the smaller lobes with the apex revolute and forming squamæform but close-placed distinct involucres the larger ones with the sides (generally) involute resembling confluent or more or less elongated involucres. (Tab. CX. A.)

Hab. Collected in the expediton from Western Texas to El Paso, New Mexico, May—October, 1849, *Charles Wright*, *n.* 823.—A small and very pretty, and as far as I can judge, very distinct species, somewhat allied in its fructifications to the East Indian *Ch. varians* of Dr. Wallich, but very much smaller and with ample distinguishing characters from that. *Ch. Alabamensis* is a much larger plant, more regular in its ramification and very uniform in the continuous involucres, as may be seen by the figures. The present is, in its squamiform involucres, much more truly a *Cheilanthes*.

21. Ch. *subvillosa*, Hook.; stipes shining brown slightly scaly, frond broad-lanceolate or ovate pinnate thin submembranaceous glabrous above, soft villous about the rachises beneath, pinnæ all obtuse upper ones lanceolate the rest broad deltoid-lanceolate or ovate pinnatifid, rarely the lowest laciniæ again pinnatifid, the margin nearly entire, involucres of nearly the same colour and texture as the frond sometimes subrotund and free mostly continuous lobed and crenated, main rachis especially above villous. (Tab. XCVIII. B.)

Hab. Western Himalaya, *Mr. Edgeworth.* — With a good deal the aspect of our *Ch. Dalhousiæ*, the present plant is nevertheless very distinct and perhaps ought to be referred rather to *Allosorus* (Presl) than to *Cheilanthes*; for the involucre is more generally continuous than in separate scales, though so lobed and crenate that it quite vacillates between the two genera. I have seen nothing corresponding with it in any other collection. Our specimens have unfortunately no root, and the stipes of all is broken.

The figures represent a medium sample. In one of our specimens the pinnæ are more, and in another less, divided than is here represented.

22. Ch. *bullosa*, Kze.; "rhizoma short thick obliquely descending," stipites 6—8 inches long terete asperous at the base and as well as the rachis and stout prominent partial rachis beneath which extends to the apex of the pinnæ deep glossy ebeneous, frond rigid coriaceous glabrous (dark olive-brown when dry) oblong-lanceolate opaque above and there under the microscope as it were minutely granulated pinnato-pinnatifid 6—8 inches long, pinnæ rather distant nearly opposite the lower ones sometimes sub-bipinnate ovato-oblong patent deeply pinnatifid the lobes linear crenate on the lowest inferior ones often again pinnatifid singularly bullate on the upper side in consequence of the sunken costa and veins (the spaces between them thus being convex), the primary lobes of the pinnæ are rather distant, so that the pinnæ may almost be said to be pinnate with a winged rachis, the margins of the lobes and teeth of the crenatures are much reflexed and form semiorbicular involucres pale at the edge which become united and more or less continuous and slightly erose at the margin in age becoming more membranous. (Tab. XCVI. A.) *Kunze in Linnæa*, xxiv. *p.* 274.

Hab. Neilgherry Hills, *Schmid*, *Koch (Kunze)*, *Dr. Gideon Thomson*. —"Species valde insignis," as Professor Kunze well observes. That able author compares it with "*Ch. elegans*, Desv. (*Ch. crenata* (Kze.), in habit; but with *Ch. pruinata* and *Mysurensis* in characters. It is however very distinct from any of them and from every species. The stipes and main and partial rachis are stout, glossy purple-black, the former asperous at the base; the partial rachis singularly stout and prominent beneath, and its glossy black colour extends to the apex of the pinnæ. The upper side of the frond is remarkable for its very opaque surface, apparently caused by minute granulations there, and the costa or partial rachis and veins are much sunk, so as to give a bullate appearance, which suggested the specific name given by Kunze.

23. Ch. *pygmæa*, Kl.; "frond ovate bipinnato-pinnatifid, pinnules obovato-subtrapeziform obtuse inferior ones pinnatifid, rachises and stipes densely ferrugineo-villose." *Kl. in Linnæa*, xx. *p.* 338.

Hab. Mexico, *E. Aschenborn*, *n.* 563, (Klotzsch).—"Rhizoma ascending, slender, pale ferrugineo-villous. Fronds 3—4 inches long, subflexuose. Stipites slender, at length glabrous, becoming black. Pinnæ lanceolate, obtuse, 5 lines long. Pinnules obliquely subtrapeziform, pinnatifid, obtuse, sparingly pilose beneath, 1½ line long, shortly petiolate." *Kl.* This is placed next *Ch. microphylla* in Dr. Klotzsch's Filices of the 'Flora der Æquinoctial-Gegenden der neuen Welt;' but I know not whether we are thence to infer that its affinity is with that species. No further remarks, than the above, are given.

24. Ch. *varians;* root tufted, stipites 4—6 inches long slender ebeneous glossy plane and margined on the upper side obsoletely setoso-paleaceous, fronds submembranaceous glabrous about a span long the pinnatifid apex acuminated, pinnated above bipinnated below, primary pinnæ distant spreading or a little curved upwards sessile, superior ones lanceolate acuminate sinuato-pinnatifid at their base and somewhat auricled at the upper base, lower ones deltoid acuminate pinnate at their base pinnatifid acuminated (caudate) in the upper half, pinnules lanceolate acuminate or acute pinnatifid below, the lowest inferior pinnæ the longest. (Tab. CIII. A.) Pteris varians, *Wall. Cat. n.* 86. Pt. cæspitosa, *Ejusd. Cat. n.* 90. Cheilanthes tenuifolia, *J. Smith, in Hook. Lond. Journ. Bot.* iii. *p.* 404, (*n.* "408," from Luzon only).

Hab. Mountains of Ava, and of Sylhet (*De Sylva*), *Dr. Wallich.* Mergui, Assam, (*Simons, n.* 262). Khasya, *Griffith.* Moulmaine, *T. Lobb, n.* 391. Luzon, *Cuming, n.* 408.—Though by no means inclined to unite this, with Mr. J. Smith, to *Cheilanthes tenuifolia*, I am not indisposed to refer it to the same Genus, though it is very questionable whether it should be placed in *Cheilanthes* or in *Pteris*, as our friend Dr. Wallich has done: and if this latter distinguished and zealous botanist were to ask a reason for doing so, I could only say that the fructification is in part *Cheilanthoid* and in part *Pteroid.* I am sure if Mr. J. Smith had possessed our numerous specimens from Eastern Bengal, and observed their uniformity, he would not have referred it to any described species of *Cheilanthes.* Dr. Wallich's appropriate name of *varians* refers to the varying form of the pinnæ on the same individual plant; the upper ones are simple and scarcely even lobed, the middle ones are deeply pinnatifid at their base, while the lowest ones are pinnate at their base. The *Pt. cæspitosa*, Wall., offers no point of difference from *Pt. varians*, Wall.

25. Ch. *Alabamensis*, Kze.; caudex creeping clothed with dense glossy brown woolly scales, stipites 4—5 inches long deep glossy black as well as the main and lower part of the secondary rachis which are hairy on one side, fronds quite glabrous subcoriaceous about as long as the stipes broad lanceolate acuminate pinnated pinnatifid above below bipinnate, primary pinnæ approximate ovate-lanceolate acuminate, pinnules or lobes of the upper pinnæ lanceolate rather acute entire or auricled or lobate at the base, pinnules of the lowermost pinnæ almost again pinnate, involucres submembranaceous mostly continuous all round the lobes and pinnules the edges slightly erose. (Tab. CIII. B.) *Kze. in Silliman's Journ.* 1848, *p.* 87. *Linnæa*, 1850, *p.* 242. Pteris Alabamensis, *Buckley, in Sill. Journ.* 1843, *p.* 177. Pteris gracilis, *Rugel, Coll. Pl. Am. (not Kaulf.)*

Hab. Southern United States, growing in tufts on limestone rocks, banks of the Tenessee river, Alabama, *Mr. Buckley.* Broad river, Tenessee, *Rugel.* Capville, Upper Georgia, *Herb. Shuttleworth.*—Notwithstanding the remark of Professor Kunze, that this is a very distinct species, to me it appears to be too nearly allied to some of the forms of *Ch. microphylla;* the form, I mean, having the most compact and acute pinnules, and with continuous involucres. Indeed Kunze himself says "it resembles *Ch. micromera*, Sw., and my *Ch. Linkiana*, (Ch. micromera, *Link*)." This *Ch. micromera* of Link, Kunze has since referred to *Ch. microphylla:* and we may, in this form, conceive that *Ch. microphylla* has attained its northern limits in the Southern States of N. America.

26. Ch. *Moluccana*, Bl.; "frond bipinnate subcoriaceous and as well as the rachis and stipes pubescent, pinnules obovate obtuse crenulate confluent above, sori continuous, involucres obsolete, stipes and rachis black-purple." *Blume, En. Fil. Jav. p.* 136.

Hab. Banda, in the Molucca Islands, *Blume.* "Locus inter *Ch. microphyllam*, Sw., et *Ch. vestitam*, Sw." *Bl.*

27. Ch. *Kleinhoffii*, Bl.; "frond pinnate pubescent beneath, pinnæ subopposite ovato-oblong obtuse repando-crenulate, upper ones entire, lower ones auriculato-trilobate, involucres obsolete continuous, rachis and stipes pubescent." *Blume, En. Fil. Jav. p.* 137.

Hab. Java. "Ex herbario javanico Cl. Kleinhoff sub nomine *Acrosticho appendiculato*, Willd. accepi." *Bl.*—The above is all the information we possess respecting the two supposed species, *Ch. Moluccana* and *Ch. Kleinhoffii*, Bl.

28. Ch. *multifida*, Sw.; caudex short thick slightly creeping clothed with black subulate scales, roots tufted fibrous, stipites 4—6 inches long plane and marginate above on the upper side terete below a little scaly at the base and as well as the rachises stout rigid deep ebony-black glossy, fronds glabrous deltoid-ovate acute when young often with glandular dots beneath tri- below quadripinnate coriaceous (in fruit), primary pinnæ subopposite broad ovate subdeltoid petiolate, pinnules or segments oblong pinnatifid, lobes subrotund convex each bearing 2 to 4 subrotund flattish appressed pale brown submembranaceous distinct involucres. (Tab. C. B.) *Sw. Syn. Fil. p.* 129 *et* 334. *Blume, Fil. Jav. p.* 157. Ch. Capensis, *Eckl. in Un. It. n.* 168. Adiantum globatum, *Poir.*

Hab. Cape of Good Hope, in rocky and stony places; extending as far as Albany, (*Harvey, in Herb. nostr.*) St. Helena, *Bennett, in Herb. nostr. Roxburgh, in Herb. Banks.* Lofty mountains of Java, *Blume, in Herb. nostr.*—If the sterile pinnæ and pinnules of this be alone inspected, its affinity with *Ch. Mysurensis* is considerable:—but the very different outline of the much more compound fronds, broadish below, will invariably distinguish

it. Blume's specimens from Java, and those from St. Helena, are identical with our numerous ones from South Africa.

29. Ch. *triangula*, Kze.; "frond triangular thick coriaceous glabrous tripinnate, pinnæ and pinnules petiolate remote patent, secondary pinnules or laciniæ oblong obtuse sinuato-lobate marginate the margin inflexed crenate, involucres marginal and as well as the sori at length diffuse contiguous, stipes and rachises flexuose rigid purple slightly hairy, caudex short." *Kunze, in Linnæa*, x. *p.* 536.

Hab. Caffraria and near the Cape, *Eklon*. Rocky places in the Sneeuwbergen, Witbergen and Compasberg, *Drége*. Natal, *Krauss*, *n.* 385.—"In habit resembling *Ch. multifida*, Sw., but differing in the triangular frond, which is triplicato-pinnate and the pinnæ not glandular beneath." Yet Kunze describes his var. *β. flexa* of *Ch. multifida* as "fronde subtriangulari (novella) subeglandulosa."—Drége, according to my herbarium, distributes two forms under this name, one marked (*d*) with young fructification, which I consider identical with *Ch. multifida*, Sw.; the other marked (*b*) without fructification, and sufficiently agreeing with Kunze's description of the frond of *Ch. triangula*, differing from *Ch. multifida* in the "triangular frond" and in the larger pinnules. Krauss's solitary Port Natal specimen in my herbarium, seems the same as this latter, but is less triangular. It has the fructification of *Ch. multifida*, and seems almost to unite the two. At any rate, we know other species of *Cheilanthes* to vary as much or more than those we are now considering.

30. Ch. *Mathewsii*, Kze.; caudex stout creeping clothed with black-brown shining scales, stipites 2—4 inches long ebeneous glossy slightly downy above, fronds a span to nearly a foot long coriaceous linear-lanceolate rather obtuse tapering much below in consequence of the contracted pinnæ there, glabrous above, the stiff rigid rachis glanduloso-pubescent, pinnate scarcely bipinnate, pinnæ subpetiolate approximate above very distant and gradually becoming very small below deltoid more or less acuminate sometimes caudate, the segments or pinnules linear-oblong deeply crenated with the margin recurved so as to give almost a beaded appearance to the pinnæ, the teeth of the crenatures bear the squamæform distinct but approximate involucres. *Kze. in Schkuhr, Fil. Suppl. p.* 50, *t.* 25. Ch. pruinata, *Kaulf. En. Fil. p.* 210. Ch. pruinosa, *Kunze, in Linnæa*, xxiii. *p.* 245.

Hab. Peru, (*Kaulfuss*). Crevices of rocks and dry places, Huamantanga, *Mathews*, *n.* 695. Bolivia, *Tweedie*, (smaller, pinnules shorter).—Kunze's plate gives a very good general representation of this very distinct Fern: except that the very beaded outline of the segments of the pinnæ is not shown. Many of our specimens are much more slender and many much longer, but they do not, although very copiously in fructification, exhibit such large, white involucres.—The texture is peculiarly firm and rigid, the

fronds drying to a dirty olive-brown colour. In the 23rd volume of the 'Linnæa,' Kunze refers the species to "*Ch. pruinosa*, Kaulf.": — but Kaulfuss' name is *pruinata*, and that name must have been given from a character which does not exist in the perfect specimens of the species, and which was probably the effect of some injury, "pinnulæ supra crusta tartarea tectæ."

31. Ch. *hirta*, Sw.; roots tufted, caudex subrepent, stipites short 2—4—6 inches long glossy purple-brown terete very hairy and more or less glandular shaggy at the base with very long glossy fuscous subulate scales, frond 1—1½ foot long lanceolate or broad oblong-lanceolate lengthened (in outline and circumscription) by the small contracted distant pairs of lower pinnæ, subcoriaceous hairy on both sides bipinnate or tripinnate, primary pinnæ crowded or lax lanceolate the lower ones opposite very distant gradually becoming small the lowermost pair often scarcely a line long, pinnules oblong or ovate pinnatifid or crenulate, the lobes with the margin recurved and bearing the copious more or less confluent sori. (Tab. CI. B.) *Sw. Syn. Fil. p.* 128 *et* 329. *Will. Sp. Pl.* v. *p.* 458. Adiantum Caffrorum, *Sw. in Schrad. Journ.* 1800, ii. *p.* 85. *Blume, En. Fil. Jav. p.* 137. *Kunze, in Linnæa*, x. *p.* 539. — Var. *parviloba*; frond bi- tripinnate calvescent, pinnæ lanceolate elongate and remote, pinnules sub-trilobed or auriculate at the base, lobes obtuse convolute, middle one oblong-linear, stipes slightly paleaceous at the base, rachis paleaceo-hirsute. Ch. parviloba, *Sw. Syn. Fil. p.* 128 *et* 331.

Hab. Cape of Good Hope: extending East to Graham's Town and Port Natal, thence North to Macalisberg, (*Burke*). Lofty mountains of Java, *Blume, in Herb. nostr.*—It would be hardly possible, with the most elaborate figures, to give a good idea of this protean species. The accurate Kunze enumerates four forms in the 'Linnæa,' vol. x.; but it would be as easy to constitute twenty as four.—The more usual state of the plant from the vicinity of Cape Town, is to be from a span to a foot high, narrow, 2 inches broad, the primary pinnules pointing upwards, most of them very approximate, the lower small ones always distant: from this form there are various gradations, in various districts, to the state which appears common at Uitenhage and Graham's Town (*Mr. Atherstone*), whence we have copious specimens from 1½ to 2 feet long, 4 and 5 inches wide, the primary pinnæ lax, horizontally patent, even the upper ones distant, the secondary pinnæ with the lower pinnules much longer than the rest, pinnatifid with longer laciniæ, and the whole of these pinnæ (not the stipes and rachis) in some specimens quite glabrous. These would come under the var. *laxa*, Kze. Blume's plant from Java is identical with the more common African one.

32. Ch. *induta*, Kze.; "frond oblong obtuse coriaceous 4—5 inches long subquadripinnate, pinnæ rather remote petiolate adscending, pinnules shortly petiolate ovate, secondary

oblong, tertiary and the laciniæ roundish-ovate, all glabrous above beneath paleaceo-hirsute, involucres marginal crenulate and as well as the sori continuous, stipes flexuose sparingly and the rachises densely paleaceo-hirsute purple, caudex creeping branched flexuose." *Kze.* (TAB. CII. A.) *Kunze, in Linnæa*, x. *p.* 538.

Hab. Rocky shady places in Sneeuwbergen, *Drége.*—"Approaches *Ch. hirta* and somewhat *Ch. lendigera*; but it differs from the latter in the curved pinnæ and very narrow scales, from the former in the more compound frond, remote pinnæ, with the pinnules twice as large and the stipes glabrous. A foot high." *Kze.* — Our specimens from Drége, marked *Ch. induta*, Kze., *a.*, are much less paleaceo-hirsute (hence a good deal resembling *Ch. multifida*, only that is quite glabrous) than those marked β., which are very paleaceo-hirsute beneath, while the upper side of the frond and stipes and rachises are glabrous. — Our figure is taken from the specimen marked β.

33. Ch. *pubescens*, H. B. K.; "fronds at the apex bi- at the base tripinnate, pinnules oblong or obovate-rotundate obtuse subsessile entire upper ones confluent, rachises pubescenti-hirsute, stipes glabrous." *H. B. K. Nov. Gen. Am.* i. *p.* 21. *Presl, Tent. Pterid. p.* 160.

Hab. At the bases of the mountains near Xalapa, Mexico: elevation 4,200 feet. *H. B. K.* — "Fronds 4—5 inches long, at the apex bi- at the base tripinnate: primary pinnæ subopposite, lower ones scarcely an inch long, superior ones confluent; secondary pinnæ alternate, 3 lines long: pinnules alternate, obovato-rotundate or oblong, subsessile, pubescent, entire, a line long, terminal ones smaller, confluent. Universal and partial rachis nearly terete, black, pubescenti-hirsute. Stipes as long as the frond, terete, black, glossy, pubescent above, towards the base clothed with subulate, diaphanous, ferruginous scales. Sori marginal, at length confluent. Sporangia ferruginous. Indusium crenate, diaphanous, glabrous." *H. B. K.* — This species is acknowledged as such by Presl and others, yet I do not anywhere find its affinities alluded to.

34. Ch. *MacLeanii*, Hook.; roots tufted from a knobbed scaly caudex, whole plant clothed with spreading glandular jointed hairs the shorter hairs the most generally glandulifcrous, stipites aggregate 2—4—5 inches long and as well as the main rachis ebeneous glossy, fronds 6—8 inches or even a foot and 14 inches long linear-oblong bi- subtripinnate membranaceous but rather rigid dark dirty-brown when dry, primary pinnæ petiolate subopposite in rather distant pairs especially the lower ones long-ovate, pinnules large (for the size of the plant) broad ovate the lower ones petiolulate and distant, upper ones confluent all lobed or pinnatifid very obtuse, involucres squamiform semiorbicular glossy-brown close pressed over the sorus all free but closely placed. (TAB. CX. B.)

Hab. Andes of Peru, *John MacLean, Esq.*—One of the most distinct of any species of the genus, of a very dingy, dirty, dark brown color (in its dry state), remarkable for the large size of the pinnules and their distant position from each other on the rachis, and for the copious glandular hairs with which the whole plant is clothed. I have not observed that any of the involucres are confluent; but although at first they are close-pressed to the under-side of the frond, the sori eventually force them back and they form a ragged edge to the pinnules and the lobes. I have never received this *Cheilanthes* from any collector but Mr. MacLean.

35. Ch. *Mysurensis*, Wall.; roots densely cæspitose the fibres very woolly, stipites slightly scaly below short 1—2 inches and as well as the main rachises deep glossy ebeneous rigid, frond a span or more long in outline narrow-oblong acute tapering below by the diminishing of the pinnæ glabrous membranaceous but firm bipinnate, lower pinnæ very small all of them oblong-ovate sessile frequently opposite pinnate below, the upper half pinnatifid, pinnules or segments linear-oblong plane (much incurved if dried without pressure) toothed or lobato-pinnatifid, each tooth or lobe bearing one or two subconfluent small whitish suborbicular sori. (Tab. C. A.) *Wall. Cat. n.* 66. Ch. fragrans, *Swartz, Syn. Fil. p.* 127 *et* 325, *t.* 3, *f.* 6, (*not* Polyp. fragrans, *Linn. Mant.* ii. *p.* 307, *which is* Ch. fragrans *of Webb and Bert. and of this work; nor* Pol. fragrans, *Linn. Sp. Pl. p.* 1550, *which is* Aspidium fragrans, *Sw.* Lastrea, *Pr.*) Ch. Swartzii, *Webb et Bert. Phytogr. Canar. p.* 454 *in note.* Ch. opposita, *Kaulf. En. Fil. p.* 211, (*incorrect in the locality*, "*Cape of Good Hope*"). Asplenium Mysorense, *Heyne, in Roth, Nov. Sp. Ind. Or. p.* 395?

Hab. "One of the most common Ferns in the Madras Peninsula, found among rocks and hills, at all heights, from 50 feet to 3,000 feet above the level of the sea," *Dr. Wight, in Herb. Wight. Propr. n.* 28. Neura Ellia, Ceylon, 6,000 feet, *Gardner.*—We have shown, under *Ch. fragrans* of Webb et Bert., that those botanists have settled the question respecting the identity of the plant of that name. It is quite clear that Swartz's *Ch. fragrans* is of Indian origin, gathered by König, probably in the Madras Peninsula, and it is equally probable that Röttler's specimens (described by Kaulfuss) were gathered in India and not at the "Cape of Good Hope?" We have, what is far more satisfactory, Swartz's figure of his Indian *Ch. fragrans*, and, making allowance for its being the work of a Swedish artist nearly half a century ago, it cannot but be commended as a faithful representation of a small plant of Dr. Wallich's *Ch. Mysurensis*. Even the magnified figures, though caricatured, show the projecting lobes which bear the sori, and which are so remarkable in this species. Some of our copious specimens are more than a foot long. All are distinguished by the black rigid stipes and rachises, and by the distant lower pinnæ diminishing almost to the base of the stipes into a mere scale. Plentiful as it is in the

Madras Peninsula, it seems quite confined to that district, and to the mountains of Ceylon, where it has been recently found by the lamented Mr. Gardner.

36. Ch. *Chusana*, Hook.; small, root tufted, stipites tufted very short 2—4 lines long slightly scaly (scales small subulate) and as well as the main rachis ebeneous glossy plane on one side or furrowed above, frond lanceolate attenuated below 3—4 inches long rather rigid subcoriaceo-membranaceous glabrous bipinnato-pinnatifid, primary pinnules petiolate subdeltoid, lower ones opposite and gradually smaller the rest alternate, secondary pinnæ rather distant and as well as the laciniæ linear crenato-lobate or lobato-pinnatifid obtuse, involucres in pairs formed of the inflexed lobules membranous and pale only at the edge distinct but copious and approximate. (TAB. CVI. B.)

Hab. Cliffs, Chusan, *Mr. Alexander*.—Apparently a very distinct species from any hitherto published, but allied to *Ch. Mysurensis*. It differs from it in the small size, broader and shorter primary pinnæ, but especially in the involucres, which are more decidedly inflexed margins of the pinnules, and always in pairs. The stipes, short as it is, is ebeneous, glossy, and plane on the upper side, and where it forms the primary rachis it is distinctly furrowed, I have seen this in no collection but that received from Mr. Alexander.

37. Ch. *tenuis*, Pr.; "fronds ovate tripinnate bipinnate at the apex, pinnules sessile oblong obtuse nearly glabrous, upper ones confluent, sori distinct, rachises and stipes villoso-paleaceous." *Presl, Reliq. Hænk. p.* 65.

Hab. Mexico, *Hænke*.—Presl says nothing about the affinities of this species, and only gives descriptive notes; "Caudex very short small, clothed with black setæ. Stipes 3 inches high filiform terete blackish-brown; villous with piliform articulated brown paleæ. Frond an inch and a half long as much wide at the base, below tri- at the apex bipinnate. Pinnæ lanceolato-oblong, obtuse, subopposite shortly petiolate. Pinnules sessile oblong obtuse deeply crenate bearing scattered hairs, 2 lines long, 1 broad: upper ones confluent. Rachises blackish brown villous with piliform articulated paleæ. Sori small distinct, situated in the sinuses of the membranaceous crenulated involucres."

Lendigera-group.

** Hairy, rarely scaly or chaffy.*

38. Ch. *lendigera*, Sw.; caudex much creeping villous with brown chaffy hairs, stipites distant a span to a foot long brown and as well as the rachises more especially densely clothed with tawny brown long scarcely chaffy hairs most copious and persistent in the rachises more or less deciduous on the stipes, fronds a span long oblong or ovato-lanceolate subcoriaceous

3- sub 4-pinnate, primary pinnæ patent from a broad base oblong acuminate, pinnules orbicular sessile, sterile ones crenato-lobate in fruit subglobose (from the great reflexion of the margins) glabrous above very villous beneath with long tawny hairs, involucre a broad white plane membranaceous margin continued all round the pinnule. (Tab. CIV. B.) Ch. lendigera, *Sw. Syn. Fil. p.* 128 *and* 328. Ch. lentigera, *Willd. Sp. Pl.* v. *p.* 460, *not Mart. and Galeotti, (according to their specimens, n.* 6391 *and* 6437). Pteris lendigera, "*Cav. Præl.* 1801, *n.* 664." Cheilanthes lanuginosa, *Mart. et Galeotti, Syn. Fil. Mex. p.* 75, *t.* 20, *f.* 2. — *β.* hairs of the rachis less copious and more chaffy. (Tab. CVI. A.) Ch. minor, *Mart. et Galeotti, Syn. Fil. Mex. p.* 75, *t.* 21, *f.* 1.

Hab. Quito and New Spain, (*Swartz*). Real del Monte and Pic de Orizaba, Mexico, elevation 6,500—9,500 feet above the sea, *Galeotti, n.* 6430. Guatemala, *Skinner*. High mountains of Sierra Nivada, Santa Martha, *Purdie*, (very fine).—*β.* Cordillera of Vera Cruz, *Linden, n.* 49. *Galeotti, n.* 6256, and *n.* 6467 and 6257, (from the Peak of Orizaba, 11,500 feet).—This does not appear to be a common plant in collections; and, notwithstanding the accuracy of Dr. Swartz's description above quoted, I fear it is often confounded with others of the *Lendigera*-group, a small section always more or less copiously woolly or scaly, with the pinnules, in fructification at least, so orbicular and subglobose as to resemble small lentil-seeds, whence more recent authors, supposing that *lentigera* (lentil-bearing) rather than *lendigera* (nit-bearing) was intended by Cavanilles, have adopted Willdenow's orthography. This species is readily distinguished from its near ally, *Ch. myriophylla*, Desv., by the absence of the copious and decidedly chaffy *scales* of the latter. *Ch. lendigera* has no true scales, though the hairs sometimes become chaffy, *i. e.*, broader and membranaceous at the base. I have seen no specimens from Quito, a habitat given, probably after Cavanilles. My finest specimens were gathered by Purdie on the Nivada de Sta. Martha, New Grenada. — I cannot consider the *Ch. minor* of Martens and Galeotti otherwise than as a mere variety of this plant, in which the hairs are so dilated below (though long and slender) as to have a chaffy appearance, a character clearly pointed out in their description.

39. Ch. *tomentosa*, Link: roots densely tufted fibrous, stipites 3—5 inches long rather slender ebeneous brown and as well as the principal rachises clothed with pale erect paleaceous hairs mixed with copious erect linear-subulate scales broad on the under side of the partial rachises and there closely imbricated, fronds 4—8 inches long oblong-lanceolate bitripinnate copiously clothed above with white woolly hairs beneath densely woolly with tawny tomentum, primary pinnæ oblong, pinnules small subrotund or obovate nearly entire the margins recurved and forming a nearly continuous involucre with the edge slightly membranaceous. (Tab. CIX. A.)

Link, Fil. Hort. Berol. p. 65. *Kze. in Silliman's Am. Journ.* 1848, *p.* 87, *(name and remarks).*

Hab. Mexico: raised from spores taken from a native specimen by *Professor Link*. Southern United States of America. North Carolina, *Rugel* (according to *Kunze*): also sent to Dr. Kunze by *Dr. Asa Gray* from Tenessee. Rattene mountains, head waters of the Colorado, *Gordon, in Herb. nostr.* Collected in an Expedition from Western Texas to El Paso, New Mexico, *Ch. Wright, n.* 816. — Brief as is the account given us of *Ch. tomentosa* by Professor Link, we can have little difficulty, though we do not possess authentic samples, in referring to it our specimens of *Cheilanthes* from Mr. Gordon and Mr. Chas. Wright. Link well observes, "frons 6—8 pollices longa, pinnæ vix pollicem longæ, petiolus (stipes) cum rachi pilis longis squamiformibus albis:" and further, "affinis *Ch. vestitæ*, at differt primo intuitu rachi dense et albo-pilosa, quæ in *Ch. vestita* pilis laxe positis ferrugineis obsita." Our specimens have the hairs of the upper surface and margin white, while the tomentum beneath is tawny: — the aspect is much whiter than any of our specimens of *Ch. vestita*. The whole plant, too, is stouter, intermediate in this respect between *Ch. vestita* and the following, *Ch. Bradburii*: — but the chief distinction from the former (*Ch. vestita*) is to be found in the presence of the erect appressed scales on the stipes, rachis, and especially on the under side of the secondary rachises, much the same character, indeed, by which *Ch. myriophylla* is distinguished from *Ch. lendigera*, only here the true scales are less numerous, and confined to the underside of the principal rachises, and scarcely conspicuous enough to justify our placing *Ch. tomentosa* in the following sub-group.

40. Ch. *Bradburii*, Hook.; root of copious fibres from a short thick horizontal caudex, stipites clustered 5—8 inches long stout brown and ebeneous scaly with long glossy ferruginous subulate scales at the very base, the rest and the rachises densely clothed with long tawny soft woolly hairs mixed with very slender long paleaceous ones, fronds oblong-lanceolate rigid 8—12 and even 14 inches long 3—4-pinnate slightly woolly with white deciduous hairs above permanently woolly with short tawny wool beneath, primary pinnules rather distant lower ones more so and petiolate all oblong subacuminate, pinnules small oval or obovate entire or only lobed as an indication of more compound pinnation, the margin recurved with a pale distinct membrane at the edge constituting the nearly continuous involucre. (Tab. CIX. B.)

Hab. Southern United States, Manitou rocks, 250 miles up the Missouri, *Mr. Bradbury*. Texas, *Drummond, second collection, n.* 254; *Lindheimer, Fl. Texana Exsiccata, fasc.* iv. *n.* 743. "Jamaica, *Mr. Wiles*," (given me as such by Mr. Lambert; but possibly one of Mr. Bradbury's, so named by mistake). Affghanistan? *Griffith, in Herb. nostr.* — Very closely allied to *Ch. tomentosa*, Link, it must be confessed; yet I think distinct in its stronger, stouter habit and larger size, more tawny (for the sparse white hairs on the upper side do not give the hoary appearance so conspicuous in *Ch. tomentosa*), the absence of real scales (although the hairs are often

paleaceous), the more oval pinnules, but above all the distinct and rather broad membranaceous margin to the involucres. All the characters of our American specimens exist equally in the Affghanistan ones.—As Mr. Lambert, I believe, possessed a full collection of Mr. Bradbury's plants from the Missouri, I cannot help expressing a suspicion that the specimen he gave me as from "Mr. Wiles, Jamaica," is a Missourian one.

41. Ch. *Szovitzii*, Fisch. et Mey.; roots densely tufted from a short thick caudex, stipites crowded 2—4 inches long slender and as well as the principal rachises ebeneous somewhat hairy mixed with copious long spreading subulate scales, fronds 3—4 inches long oblong-lanceolate quite glabrous above densely woolly and generally tawny beneath tri-subquadripinnate, primary pinnæ ovate acuminate approximate or distant, pinnules small subrotund or subcordate sublobate, terminal ones often larger and oblong, the margin revolute forming nearly a continuous involucre the edges obscurely membranaceous. *Fisch. et Meyer, in Hohenacker, En. Pl. Prov. Talysch, p.* 11.—*α. nudiuscula;* woolly covering short and entirely confined to the underside of the pinnules. (Tab. XCIV. B.) Cheilanthes suaveolens, *β.*, fronde subtus villoso-hirsuta, *Hohenacker, in Herb. nostr.* — *β. Stocksii;* woolly covering of the under-side of the frond exceedingly dense tawny, so copious and spreading as at first sight apparently to invest the whole frond.

Hab. *α.* Rocks near the fort of Schuscha, in Talysch, province of Karabagh, Caucasian Alps, *Honenacker.* Crevices of rocks, Pushut, Kooner-Kafanistan, in Affghanistan, *Griffith, n.* 11, *in Herb. nostr.* Indus valley, 7,500 feet; rocks, Kashmir; and in Western Tibet, 8,500 feet, *Dr. T. Thomson.* — *β.* Chihil Tun, Scinde, *Dr. Stocks, n.* 1020, *in Herb. nostr.* Affghanistan, with *α., Griffith.* Iskardo, valley of the Indus, 7,000 feet, *Dr. T. Thomson.* — So closely does this *Cheilanthes* resemble in habit and ramification and woolliness the North American *Ch. vestita*, that notwithstanding the respective countries are so widely apart, I was disposed to consider it at first a local variety of that species: but when in conjunction with the different locality I find that our oriental specimens, gathered in several regions, have the upper side of the frond invariably glabrous (however densely woolly the under side may be), and that there are always copious scales mixed with the hairs on the stipes and rachises, I consider it safer to keep them distinct: and our Tab. XCIV. B. exhibits a faithful representation of the less woolly state originally found by Hohenacker, and obligingly communicated to me many years ago by its discoverer, under the name of *Ch. suaveolens* (meaning our *fragrans*) *β.*, frondibus subtus villoso-hirsutis. The size and ramification do indeed considerably resemble that species: but the vestiture and involucres are quite different.

42. Ch. *vestita*, Sw.? roots tufted, stipites 3—4 inches long slightly scaly at the base flexuose and as well as the main rachis ebeneous and laxly woolly, fronds about as long as the

stipes lanceolate or ovato-lanceolate tri-quadripinnate hirsute with longish soft hairs above and, at the margins beneath and on the partial rachis, densely woolly the wool more or less tawny, primary pinnæ ovate the lower two pairs generally remote upper ones more crowded, pinnules small nearly orbicular obscurely crenato-lobate at the margins the terminal pinnule generally larger and more oblong, the margin recurved and forming the nearly continuous involucres not membranous at the edges. (Tab. CVIII. B.) *Sw. Syn. Fil. p.* 128? *Schkuhr, Fil. p.* 1162, *t.* 124? *Willd. Sp. Pl.* v. *p.* 456. Ch. lanuginosa, *Nutt. MS. in Herb. nostr.* Adiantum vestitum, "*Spreng. Anleit.* iii. *p.* 122." Aspidium lanosum, *Sw. Syn. Fil. p.* 58, *(Willd.)* Nephrodium lanosum, *Mich. Am.* ii. *p.* 270. Notochlæna vestita, *Desv. J. Sm.* — β. smaller, tripinnate, primary pinnæ all distant.

Hab. N. America. Not unfrequent in the Southern States; westward to Texas and El Pasco (New Mexico), *C. Wright, n.* 818. Missouri, St. Louis, *Engelman*, (var. β.); Independence, *Nuttall*, to the Rocky Mountains in about lat. 52°. California, and New Caledonia, Oregon, *Douglas*. —What we here describe and figure as *Cheilanthes vestita* is, we know, the plant so considered by American botanists, and is no doubt the *Nephrodium lanosum* of Michaux, Fl. Bor. Am. (1803), and he properly describes the fronds as "lanosissimæ." Swartz, however, who adopts Sprengel's (prior?) specific name, *vestita*, given in a work to which I have no immediate access, describes the fronds as *hispidulous*. Schkuhr adopts the same term, and figures a plant, the under side of which gives no idea of the really woolly nature of the frond; having, moreover, entire oblong pinnules, with a solitary terminal involucre.—The hairs of this species are everywhere crisped and woolly, very dense on the under side, often sparse and deciduous on the upper side.

Lendigera-group.

*** Very scaly.*

43. Ch. *scariosa*, Pr.; caudex 3 inches and more long descending radicose the summit densely crinite with ferruginous chaffy hairs, stipes 1—2 inches long and as well as the rachis and lanceolate bipinnate frond (about a span long) clothed above with dense silky wool and beneath everywhere with closely imbricated white diaphanous ovate scales ciliated and villous at the margin often rich brown in the centre, bipinnate, pinnæ short lanceolate of 5—9 almost globose coriaceous pinnules glabrous above woolly beneath crenato-lobate at the margin, the margins involute and forming the involucres. (Tab. CIV. A.) *Pr. Reliq. Hœnk. p.* 65. *Kunze, in Linnæa*, ix. *p.* 85. Acrostichum scariosum, "*Willd. Sp. Pl.* v.

p. 125." *Sw. Syn. Fil. p.* 16. A. lanuginosum, "*Willd. in Act. Erford.* 1802, *p.* 31, *t.* 3, *f.* 4."

Hab. Mountains of Peru, *Dombey*, *Presl.* Fissures of rocks between San Rafael and Huarriaca (Huanaca?), Peruvian Andes, *Poeppig.* Limestone rocks ascending the Cordillera from Tarma, Andes, Peru, *Mathews*, *n.* 610, *MacLean.*—I have not had the opportunity of seeing the figure of this plant published by Willdenow, nor have I any specimens from Mexico, where the plant is said by Willdenow to have been found, and where it was detected by Karwinsky, according to Kunze. Our Peruvian specimens are extremely distinct from *Ch. lendigera*, to which Presl says it is "maxime affinis," nor should we be at all disposed to say with Kunze, "*Ch. squamosa*, Hook. et Grev. t. 151, differt fronde bipinnata." Presl remarks that Willdenow's specimens are "quadripinnate." Ours are bipinnate, as Swartz and Kunze describe the species: but so dense is the mass of silky wool on the upper side (springing indeed from the rachis but covering and concealing the whole frond) and so dense the mass of scales beneath, that it is only by carefully removing these coverings that the true nature of the ramification or the pinnules themselves can be seen. It is an extremely beautiful white and silvery species, probably rare: for ourselves, we have only received Andine Peruvian specimens from Messrs. MacLean and Mathews. When dry, the pinnæ are very apt to roll or to be reflexed back towards the upper side of the rachis. —I dare not quote the *Ch. scariosa* of Dr. Klotzsch, 'Linnæa,' xx. 338 as a synonyme to our plant. His is a plant from Caraccas, of Moritz, n. 33, and he further quotes Hartweg's n. 1518 from Columbia, both of which are clearly what we here consider *Ch. elegans*, and he quotes *Ch. lendigera* of Presl, not his *Ch. scariosa*, which latter, nevertheless, I think is clearly ours, for he speaks of the frond as "squamis lanceolatis scariosis *albis diaphanis* densissime obtecta." Willdenow, too, the original authority for our plant, expressly says, "singularis filix fronde bipinnata ex toto squamis albis nitidis obtecta ita ut de pinnulis nemo aliquid observet," which could not be said of Moritz' n. 33, nor Hartweg's n. 1518: a species of *Cheilanthes* that must have been familiar to Willdenow. Klotzsch, on the other hand, gives the Herbarium of Ruiz and Pavon as containing his *Ch. scariosa* "in Andium montibus ad Huanuci et Tarmi tractus," which seems to be exactly the region of our plant. He further quotes a Peruvian plant of Dombey's herbarium from Peru, and Mr. John Smith has a specimen of our Fern from Dombey in his collection. Dr. Klotzsch however offers no distinctive remarks on his species.

44. Ch. *myriophylla*, Desv.; roots tufted, caudex scarcely any nodose clothed with black bristly appressed scales, stipites tufted 3 inches to scarcely a span high clothed as well as the rachises with copious ash-coloured hairs, the rachises have in addition copious ovate or ovato-lanceolate pale brown membranaceous ciliated ovate or lanceolate scales which cover and conceal the under side of the pinnules, fronds 4—6—8 inches long oblong or lanceolate rigid subcoriaceous trisubquadripinnate, primary pinnæ oblong subacuminate rather closely placed, secondary pinnæ linear-lanceolate, pinnules

minute sessile orbicular and subglobose from the inflexed fructified margins glabrous above very hairy beneath, involucres a continuous membrane forming a pale edge to the recurved margin (the hairs of the partial rachises and of the under side of the pinnules often long and crisped and more or less enveloping the whole of the minute pinnules). (TAB. CV. A.) *Desv. in Journ. de Botanique*, ii. *p.* 44, *t.* 13, *f.* 1. *Kunze, in Linnæa*, ix. *p.* 85? Ch. elegans, *Kunze, according to his specimen (of Poeppig) from Peru, in Herb. nostr. H. B. K. Nov. Gen. Am.* i. *p.* 22, *(according to Kunze).* Notholæna mollis, *Kunze, in Linnæa*, ix. *p.* 54, *(according to his specimen from Poeppig in my Herbarium).*

Hab. South America, (*Desvaux*). Andes of Quito, *Jameson.* Loja, Equador, *Seemann*, *n.* 948. San Rafael, Huanuco, elevation 6,000 feet, Peru, *Poeppig*, *MacLean.* Chacapoyas, and Purrochuca, on dry sandy banks, *Mathews*, *n.* 607. Bolivia, *Pentland.* Sta. Martha, *Purdie.* Toluca and near Oaxaca, Mexico, *Andrieux.* — A species first distinguished from *Ch. lendigera* by Desvaux. It is much smaller than that, has tufted stipites springing from a small nodose caudex, narrower fronds, copiously clothed at the back with scales (springing from the rachises) as well as hairs, smaller but equally rounded, and sessile pinnules. Kunze's *Ch. elegans*, of his distributed specimens, is clearly our *Ch. myriophylla.* He refers the *Ch. myriophylla* of H. B. K. to his *Ch. elegans*, but whether justly so or not I am unable to say.

45. Ch. *Lindheimeri*, Hook.; caudex very long about as thick as a crow-quill creeping branched and entangled clothed with brownish scales, stipites scattered 4 inches to a span high ebeneous beset with subulate narrow lanceolate cinereous appressed more or less deciduous scales, more abundant upwards and in the rachises where they are copiously mixed with larger ovate fimbriated brown scales covering the under side of the pinnæ and fine cinereous wool which more or less densely covers and conceals the upper side of the pinnæ, fronds 3—5 inches long ovato-lanceolate subcoriaceous tripinnate, primary pinnæ oblong acuminate approximate lower ones more distant nearly opposite, secondary pinnules crowded linear oblong, pinnules very minute densely crowded sessile subglobose glabrous above woolly beneath the margins much recurved, involucres formed by the continuous recurved margins having a very narrow membranous edge. (TAB. CVII. A.)

Hab. Western Texas, *Lindheimer, Fl. Tex. Exsic. n.* 744, (1847). Between Western Texas and El Pasco, New Mexico, *C. Wright, n.* 817, (1849). Sierra Madre, New Mexico, *Seemann*, *n.* 1934, (smaller specimens, but otherwise identical).—It is not without considerable hesitation that I constitute a new species of this, yet I cannot by any means satisfactorily refer it to

E852.1

any described one. The copious scales on the under side of the frond readily distinguish it from *Ch. lendigera*, which it resembles in the long creeping caudex. The rounded sessile pinnules keep our plant distinct from *Ch. elegans*, and the very woolly or tomentose upper side of the frond, the very crowded pinnules and secondary pinnæ and compact habit, and above all the long creeping caudex separate it both from *Ch. elegans* and *Ch. myriophylla*.

46. Ch. *elegans*, Desv.; roots tufted, caudex scarcely any nodose clothed with dark brown appressed bristly scales, stipites tufted a span to nearly a foot long clothed as well as the rachises with numerous pale brown hairs, the partial rachises in addition with copious brown fringed scales concealing the under side of the pinnules, main rachis often zigzag, fronds a span and more long broad-oblong or ovato-lanceolate tripinnate acuminate, primary pinnules often lax from a broad base oblong acuminate, secondary pinnæ lanceolate rarely again pinnated, pinnules very minute glabrous above villous beneath obovato-globose (subpyriform) with the margins much recurved tapering at the base (especially the terminal ones) into a distinct short petiole, involucres apparently formed of the recurved margin of the pinnules with scarcely any membranous edge, (hairs of the partial rachis and under side of the pinnules woolly with the wool concealing more or less the entire minute pinnules). (Tab. CV. B.) *Desv. in Journ. Bot.* ii. *p.* 43, *t.* 13, *f.* 1. *Kunze, in Linnæa*, ix. *p.* 85? Ch. lendigera, *Mart. et Galeotti, Syn. Fil. Mex. p.* 74, *and* Ch. paleacea, *p.* 76, *t.* 21, *f.* 2. Ch. lendigera, *Moritz, in Herb. Caracas (not Sw.), n.* 33.

Hab. Chili, (*Desvaux*). Quitinian Andes, *Jameson*. Columbia, between the village and bridge of Guapulo, *Hartweg, n.* 1518. Andes of Peru, *MacLean*. Caracas, *Moritz, Linden, n.* 512. Mexico, *Bates*. Oaxaca, and near Tampico, elevation 6,500—8,000 feet, *Martens and Galeotti, n.* 6391, 6437, and 6429. Tucuman, *Tweedie*. La Casa Pintada, Rio del Diamante, eastern side of the Cordillera of Chili, *Dr. Gillies*. — This species was, as well as our *Ch. myriophylla*, first distinguished by Desvaux, and assuredly the majority of our specimens have the minute pinnules so distinctly tapering into a petiole, generally too accompanied by a broader form of frond, a more lax habit, and frequently a zigzag main rachis, that the differences are almost perceptible with the naked eye, and distinctly seen with a small power of the lens. Others again have the side pinnules almost if not occasionally quite sessile, though the terminal pinnule is petiolate; so that I am sometimes led to doubt of the permanency of the character. Both in *Ch. myriophylla* and *Ch. elegans* the same copious scales accompany the hairs on the rachises, covering and concealing the under side of the pinnules: and in both the hairs of the partial rachises and of the under side of the pinnules are so long and woolly as to cover and partially conceal the upper side of the pinnules.

47. Ch. *Fendleri*, Hook.; small, caudex creeping scaly, stipites sparse scattered slender brown scaly with subulate appressed scales, in the main and secondary rachises the scales become more copious broader ovate acuminate white glossy brown at the base, fronds 2—3 inches long ovate-lanceolate subcoriaceous pale green quite glabrous on both sides tripinnate, primary pinnules ovato-lanceolate obtuse, pinnules rather large for the size of the frond convex broad cuneate sessile somewhat decurrent retuse at the apex entire or 2—3-lobed, the margins of the lobes merely incurved scarcely confluent and forming the involucres. (TAB. CVII. B.)

Hab. New Mexico, *Fendler, in Pl. Nov. Mex. n.* 1015, (1847).—In many respects this species of *Cheilanthes* approaches the Lendigera-group: but it is the smallest of that section, and has the pinnules larger than any. There are no hairs on this plant whatever; where the scales are discontinued on the under side, as at the secondary pinnæ, the pinnules are seen to be quite glabrous, and the rachises even of the primary pinnæ have no scales or clothing of any kind, and are of the same texture and pale green colour as the pinnules.

48. Ch. *speciosissima*, Alex. Braun; stipes 3—4 inches long squamose with copious large ferruginous lanceolate spreading scales, the same scales are continued but diminishing in size upwards on the main rachis and on the partial rachises and becoming rather chaffy hairs, frond ample broad-lanceolate acuminate 1½—2 feet in length coriaceous rigid bipinnato-pinnatifid ferruginously hairy on both sides but especially beneath, primary pinnæ approximate linear-oblong acuminate sessile 2—4 inches long pinnatifid at the apex, secondary pinnules oblong obtuse broadest at the base pinnatifid, lobes or segments oblong obtuse entire the margin much recurved, involucres continuous formed of the recurved margins become membranaceous and more or less cut or jagged at the edge.—*Alex. Braun, in Kunze, Analect. Pteridogr. p.* 35, *t.* 23. *Kunze, in Linnæa*, xiii. *p.* 145. *Benth. Plantæ Hartw. p.* 54. Ch. scariosa, *Mart. et. Galeotti, Syn. Fil. Mex. p.* 74. Plecosorus, *Fée.*

Hab. Mexico, *Karwinski.* Near Real del Monte, *Hartweg.* Coscomatepee, Vera Cruz, *Linden, n.* 44. Peak of Orizaba, 12,000 feet elevation, *Galeotti.* — Kunze may well speak of this noble plant as "Filix vere speciosissima:"—some of our specimens show that they attain a length of frond exclusive of stipes, of 2 feet. Yet this species has been referred by Martens and Galeotti to *Ch. scariosa*, Kaulf. (Acrostichum scariosum, *Swartz and Willdenow*). Kunze's figure and description are alike excellent.

(Rachis zigzag).

49. Ch. *dichotoma;* roots tufted, plant wholly glabrous, stipites (4—6 inches long) as well as the zigzag rachis slender ebeneous glossy, fronds a span to a foot long oblong tri-quadripinnate, tertiary pinnæ often trifoliolate, pinnules sparse remote small cordate or ovate subtrilobate or incisopinnatifid ultimate lobes often cuneate, each bearing 1—3—4 free rounded small involucres pale at the apex, often confluent. (Tab. CII. B.) *Swartz, Syn. Fil. p.* 129 *and* 335, *t.* 3, *f.* 7. *Willd. Sp. Pl.* v. *p.* 560. Hypolepis trifida, *Klotzsch, in Herb. nostr.*

Hab. Mount St. Antonio, Quito, *Née, (Swartz).* Brazil, *Sellow,* from the Royal Berlin Herbarium. Uruguay, *Mr. Jas. Baird, in Herb. nostr.* — Our first knowledge of this plant is from Swartz, who describes and figures it from Quitinian specimens, gathered by Luis Née. Dr. Klotzsch, unaware of that description, has given it as a new species of *Hypolepis.* It is, however, a true *Cheilanthes,* according to our view of the Genus, and very different from any other species known to me. The roots are densely tufted, as well as the stipites. Stipes and very zigzag and extremely slender capillary rachises glossy ebeneous, plane on the upper surface and margined: lower part of the stipes only scaly. The fronds are quite glabrous, a foot long, primary pinnules elongated, secondary and tertiary shorter, pinnules often ternate (whence probably the name *trifida*), small, sparse, not much unlike the smallest leaflets of *Thalictrum alpinum.* The species is probably quite confined to South Brazil; and it is more than likely that the Quitinian locality given by Swartz has originated in some error.

50. Ch. *flexuosa,* Kze.; "frond rigid subcoriaceous puberulous ovate-oblong acuminate at the base quadri- tri- or bipinnate less divided at the apex, primary pinnæ opposite or alternate petiolate (ad tripinnatis), lower ones arrect or patulous upper ones patenti-divergent, ultimate pinnules petiolate suborbicularo-ovate crenate or incised, sori of few capsules, involucres spurious, partial rachises rigid furrowed above rough flexuose slender purple-black, universal rachis short stout purple-black shining, rhizoma horizontal clothed with subulate appressed brown scales." *Kunze, in Linnæa, t.* 22, *p.* 578. "Ch. microphylla," *Bongard in litt. (non Sw.)* —*β. minor;* contracted bipinnate. *Kze. l. c.*

Hab. Brazil; Cape Goyan, *Pohl, Riedel.* — *β.* Minas Geraes, in very sterile places, *Regnell.* — "Plant with a habit between *Ch. dichotoma* and *Ch. chlorophylla,* but readily distinguishable. It ordinarily attains a foot in length; the dwarf state only about 2 inches." *Kze.*

(*Fronds broad triangular.*—*See* Ch. triangula, *at p.* 91).

51. Ch. *viscosa,* Link; an Kaulf.? roots tufted, stipes with

intensely black glossy subulate scales at the base 8—10 inches long slender and as well as the rachises purple-brown glandularly hirsute, fronds submembranaceous pale green minutely glandularly pubescent 6 inches long deltoid ternately tripinnate, pinnæ (except the lowest usually opposite pair) approximate and compact, upper ones lanceolate, middle ones ovato-acuminate, lowest ones deltoid the lower inferior divisions the longest, pinnules rather small obovate convex (the margins much rolled back when dry) lobed or more or less pinnatifid, involucres membranaceous whitish punctiform or more or less continuous frequently the reflexed termination of a lobule. (Tab. XCIII. B.) *Link, Fil. Sp. Hort. Reg. Ber. p.* 66, *(not Carm. Fl. of Trist. da Cungha, which is a* Polypodium). Ch. Kaulfussii; *Kze. in Linnæa*, xxiii. *p.* 244 ? — *β. minor;* lobules of the pinnules in the dried plant cochleate.

Hab. "Mexico," (*Link*). Realego, El Equador, *Dr. Sinclair*. Central America, *Barclay*.—*β*. Sierra Madre, N.W. Mexico, *Seemann*, *n.* 1994.—I am not aware that this is noticed by any author save Link, who describes it from a cultivated plant in the Berlin Garden, and by Kunze in his 'Index Filicum cultarum,' in the 23rd vol. of the 'Linnæa,' who however only changes the name of "*viscosa*," Kaulf. (Link?) to *Kaulfussii*, on the ground that it is not *Ch. viscosa* of Carmichael. Such indeed is the fact; but as Capt. Carmichael's original plant is in my possession, I can testify to its being no *Cheilanthes*, but a *Polypodium*, nearly allied to, if not identical with, *P. rugosulum* of Mr. Brown's Prodromus. Our figure and specific character are taken from native specimens, which, however, seem to differ in no respect from cultivated ones sent from Berlin to the Royal Gardens of Kew. It is a well-marked species, though save in the absence of the glandular hairs, a good deal allied to *Ch. chærophylla*, as far as can be judged from that figure. In the native dried specimens the pinnules and lobes are remarkably convex, in our smaller variety from Sierra Madre particularly so; giving the ramifications quite a beaded appearance.

52. Ch. *leucopoda*, Link; "frond ternately quadripinnate, ultimate pinnules crenato-pinnatifid with scattered hairs above and below, stipes and rachis whitish, hairs viscid." *Link, Fil. Sp. Hort. Reg. Berol. p.* 66. *Kze. in Linnæa*, 1850, *p.* 244.

Hab. Mexico, (*Link*). — "Frond with the stipes scarcely 4 inches long, primary pinnæ an inch and a half, secondary 1 inch, tertiary 4 lines, ultimate ones a line long, with long white spreading hairs on the stipes and rachis."

Link, who alone has described this species as above, and it must be confessed very unsatisfactorily, places it next *Ch. viscosa*, but without offering any remarks on its affinities.

53. Ch. *marginata*, H. B. K.; caudex short thick horizontal clothed with subulate black scales, stipites 2—4—6

inches long and as well as the main rachis ebeneous, fronds 3—6 inches long glabrous thick-membranaceous rather soft and flaccid deltoid-ovate tri-quadripinnate, pinnules all oblong-obovate or subcuneate entire or lobed auricled at the base above and more or less deeply pinnatifid all of them decurrent so as to form a winged rachis, lobes oblong-ovate, sterile pinnules and lobes the broadest and penniveined, all of them crenate at the margin, involucres on the teeth of the crenatures broad membranous suborbicular rarely free (the edge very thin and fringed) mostly combined and forming a continuous lobed or broadly crenated involucre extending all round the margin.—*H. B. K. Nov. Gen. et Sp. Am.* i. *p.* 18, *and* vii. *t.* 669. *Link, Fil. Sp. Hort. Berol. p.* 62. Ch. rufescens, *Link, l. c.* Ch. chærophylla, *Kze. in Linnæa*, xxiii. *p.* 243, *and* 307. Allosorus ciliatus, *Presl, Rel. Hænk.* i. *p.* 59. *Kunze, in Linnæa*, ix. *p.* 56, *and in Poepp. Pl. Exsic. (Herb. nostr.)* Allosorus chærophyllus, *Mart. et Gal. Fil. Mex. p.* 47, *t.* 11.

Hab. Rocky places, Peripe, Andes of Quito, 7000 to 8000 feet elevation, *Humboldt and Bonpland:* and on old walls near Quito, *Jameson, Hartweg, n.* 1513. Andes of Huanuco, Peru, *Poeppig, MacLean.* Mexico, *Hænke;* Juquilla, Andes of the Pacific Ocean and Oaxaca, *Martens and Galeotti, n.* 6367 *and* 6844. Real del Monte and Xalapa, *Dr. Coulter, n.* 1676 *and* 1677. Caracas, *Linden, n.* 508. Venezuela, *Funck and Schlim.* St. Sebastian, Sierra Nevada, Sta. Martha, N. Grenada, and Jamaica, *Purdie.* Tondil and Salto, Argentine Republic, *Tweedie.*—A very remarkable and easily distinguished plant, and pretty widely distributed, even well figured (both by Humboldt and Galeotti), yet strangely misunderstood. Kunze, who distributed Poeppig's *Allosorus ciliatus* under that name, did not seem to be aware that Martens and Galeotti's *Allosorus chærophyllus* was identical with it, for he separates it from *Allosorus*, with the remark "indusia spuria lobulata et sæpius interrupta ad *Cheilanthem* sine dubio delegant." He was familiar with the Mexican and Peruvian plants, yet places them in two different genera. Humboldt's name is very characteristic. Link's *H. rufescens* is appropriate to some states of this plant, which is very variable in colour. There seems no reason why Presl should change Humboldt's specific name to "*ciliata*," unobjectionable as the latter may be in allusion to the generally ciliated edge of the involucres, well represented by Humboldt, but omitted by Martens and Galeotti. The broad involucres, when continuous on each margin, almost meeting at the back, resemble those of *Cryptogramma crispa*, Br.

(*Involucres continuous.* Pteridoideæ).

54. Ch. *deltoidea*, Kze.; "frond triangular subcoriaceous bipinnato-pinnatifid glabrous, pinnæ obliquely ovate, pinnules and segments ovate obtuse with the cuneate base decurrent, stipes smooth, rachises margined and the costules

sulcate above black-purple beneath, involucres marginate crenulated continuous, sori rather broad." *Kunze, in Linnæa*, x. *p.* 535.

Hab. Fissures of rocks, Zilverfountain, Little Namaqua Land, Cape of Good Hope, *Drège.*—"I have seen only three fronds (2½—3 inches long) of this species, destitute of caudex: in habit it resembles small specimens of *Pteris pedata;* but it is bipinnato-pinnatifid. Our *Ch. triangula* differs from this in the tripinnate frond, the pinnæ and pinnules petiolate, in the sulcated stipes, &c. Our *Ch. multifida*, β., *flexa*, differs in the true indusia (indusiis veris) and in the puberulous rachises, &c." *Kze.*—I have myself but a solitary specimen of this from Drège. It appears a good species, with quite pteroid involucres. But one needs copious specimens in different stages of growth to speak with confidence.

55. Ch. *Atherstonii*, Hook.; root? caudex? stipes a span and more long stout and as well as the principal rachis all purple-ebeneous and very glossy, frond deltoid less than a span long everywhere glabrous coriaceous pale green 4-pinnate (pteroid), primary pinnæ ovato-deltoid and as well as the secondary and tertiary pinnæ petiolate the lower distant upper ones more approximate, pinnules sessile (upper ones coadunate) oblong entire or pinnatifid in their lower half, involucres formed of the inflexed margins of the pinnules pale and membranaceous at the edge rarely solitary and single generally coadunate so as to be continuous the edge more or less crenate or lobed.

Hab. District of Somerset, S. Africa, *Mr. Atherstone.*—I possess no species with which I can say this is closely allied among *Cheilanthes;* nor among *Allosorus*, to which this might with about as much propriety be referred. The whole Fern is 12—14 inches long, very hard, rigid, and particularly glossy and stout in the stipes and primary rachises.—Perhaps its nearest ally is Kunze's *Ch. deltoidea*, but that is a very much smaller plant and much less compound. The pinnules of *Ch. Atherstonii* are about 2 lines long and two-thirds of a line wide.

56. Ch. *cuneata*, Link; caudex short creeping, stipes 1—1½ foot long and as well as the main rachis ebeneous glossy grooved on the upper side smooth, frond glabrous subcoriaceous ovate or broad-ovate acuminate 6—12—14 inches long 3—6 inches across tri-quadripinnate, primary and secondary pinnules ovato-acuminate, the rest and the pinnules lanceolate cuneate below all of them decurrent so as to form a narrow green margin or wing on each side the furrow of the rachis, ultimate pinnules shortly but sharply almost pungently acuminate entire or auricled on the upper inferior margin or pinnatifid with lanceolate entire sharp lobes, all slightly serrated, involucres marginal or subentire pale membranaceous punc-

tiform or linear often quite continuous slightly waved and jagged or crenated. *Link, Fil. Sp. in Hort. Berol. p.* 63. *Kze. in Schkuhr, Fil. Suppl. p.* 73, *t.* 36. Otholoma, *Link.* Cassebeera, *J. Sm.* Allosorus, *Pr.* Allosorus pulchellus, *Mart. et Galeot. Fil. Mex. p.* 47, *t.* 10, *f.* 2.

Hab. Mexico, Province of Oaxaca, elevation above the sea 7,000 feet, *Galeotti, n.* 6560. Cerro de Pinel (*n.* 1450), Sierra Madre, N.W. Mexico, *Seemann, n.* 1932. Sierra San Pedro Nolasco, Talca &c., *Jurgensen, n.* 670.—The frequently continuous sori would lead to the opinion that this should be ranged in *Pteris* or *Allosorus:* other specimens, and I cannot say depending on age, have quite the small rounded punctiform involucres of *Cheilanthes*, yet gradually upon the same specimen more or less combined and continuous all round a lobe or pinnule. As *Cheilanthes*, it is extremely distinct from any other: the pinnules and lobes are harsh and rigid and almost cuspidate, so as to resemble those of some *Polystichum.* Our specimens from Sierra Madre are very much larger and more divided than those of Kunze's figure: the fronds and the stipes too are very brittle. Some of my specimens correspond so exactly with Martens and Galeotti's figure and description of their *Allosorus pulchellus*, that there cannot be a question of the identity of the two.

57. Ch. *profusa*, Kze.; roots slightly creeping scaly, stipites 2—4 inches long and as well as the rachises hispid with spreading subulate paleaceous scales, frond oblong-lanceolate acute subcoriaceous pinnate, pinnæ often opposite glabrous, uppermost lanceolate approximate subcoadunate entire, lower ones ovate or deltoid acuminate distant very shortly petiolate deeply pinnatifid at their base sometimes pinnate, pinnules and laciniæ lanceolate rarely slightly lobed or pinnatifid often curved a little upwards, costæ hispid with appressed narrow subulate scales, involucres of the same texture as the frond continuous, — from the same root another form of frond appears smaller with fewer and more approximate pinnæ which are ovate blunt and only sinuato-lobate the edges membranaceous subcrenulate. *Kunze, in Linnæa*, xviii. *p.* 535, (1850), *p.* 244, *et in Schkuhr's Fil. Suppl. p.* 33, *t.* 17. Notochlæna, *Pr.*

Hab. Namaqua Land, *Drège.* — My specimens of this are from Zeyher, n. 4627. These exhibit only the usual form as figured and described by Kunze. But our cultivated plants produce from the same root the form which Kunze makes "Var.? *β., minor;* pinnis approximatis abbreviatis inciso-pinnatifidis costis rachibusque calvescentibus:" and which if seen separately would naturally be taken for a distinct species. It is well figured by Kunze in the plate above quoted, fig. *c.* In the coriaceous texture of the frond and the continuous involucres it has an affinity with certain Cape species of *Pteris* or *Allosorus.*

58. Ch. *cornuta*, Kze.; "frond lanceolato-linear bipinnate, pinnæ ovate approximate the lowest subopposite petiolate, pinnules sessile subternate bi- or trifid oblong obtuse curved coriaceous, sori at length diffuse, stipes and rachis rigid (setaceo-paleaceous at length) naked." *Kze. in Linnæa*, x. *p.* 534.

Hab. Worcester District, Cape of Good Hope, *Ecklon and Drège.*—"A species not to be compared with any unless with several contracted forms of *Ch. hastata*; but the rigidity of the frond, its nearly linear outline and diffuse sori readily distinguish it."—Kunze's specimens would appear to have been far from good. If those of Drège himself in my herbarium are to be depended upon, this is nothing more than, not even a variety of, *Ch. profusa*, next before which Kunze places it, but without the slightest allusion to its affinity with that species. My specimen is marked by Drège "*Cheilanthes cornuta*, Kze., *a.*" The slight curvature upwards of the pinnules which suggested, I apprehend, the specific name, is common to the normal state of *Ch. profusa*: and there can be no question of the identity of the two, unless Drège has made some mistake.

59. Ch. *pulchella*, Bory; roots cæspitose, stipites 4—6 inches long purple-brown glossy scaly below, fronds ovate or deltoid-ovate acuminate tripinnate coriaceous glabrous, primary pinnæ all more or less caudate at the apex, lowest pair dimidiato-deltoid their lowest inferior pinnæ elongated pinnate or pinnatifid, pinnules or lobes oblong or linear-oblong obtuse entire, involucres membranaceous intramarginal continuous brown transversely wrinkled and lobed at the edge. (Tab. XCIV. A.) —*Bory in Willd. Sp. Pl.* v. *p.* 456. *Webb and Berth. in Phytogr. Canar. p.* 453, *t.* 252, (*excellent*). Cheilanthes n. sp.? *Schimp. Coll. It. Abyss. n.* 1431.

Hab. Teneriffe, *Bory.* Canary and Palma, *Webb et Berthelot, Dr. Lemann.* Madeira, *Webb et Berthelot.* Rocks in the valley of Mai Mezano near Djeladjeranne, Abyssinia, *Schimper.*—Schimper's specimens are smaller than most (but not than all) of Mr. Webb's and Dr. Lemann's specimens of this very pretty fern; but in no other respect different. We have thus another station to add. Messrs. Webb and Berthelot had observed on its geographical station, "Fortunatarum et Maderæ! cives est pulchra species autochton." — It would be a *Pteris* or *Allosorus*, of the group which produce intramarginal sori, but for the transversely wrinkled involucres indicating what is considered the normal character of *Cheilanthes*,—interrupted sori.

60. Ch. *coriacea*, Desne; "cæspitose (2—3 decimetr.), stipites terete ferruginous clothed with hairs and attenuated scales, fronds bipinnate simply pinnate above, pinnæ opposite, lower ones bifid, the segments approximate linear-oblong obtuse entire coriaceous furrowed on the upper side and opaque,

beneath in the younger state covered by the ferruginous shining indusium." *Decaisne, Plantes d'Arabie, p.* 190.

Hab. Haguef, Arabia Felix, *Botta.*—"Allied to *Cheilanthes pulchella.* This plant, the *Ch. pulchella*, together with a new Abyssinian species" (not further noticed by the author), "exhibit, in their younger state, the pinnules wholly covered by an indusium, which is smooth and shining and gives to the inferior surface a coppery appearance. Notwithstanding this character, these three plants belong to the group of *Ch. farinosa*, remarkable in the form, the consistence and colour of the stipes. The mode of division of the fronds and the bifurcation of the inferior pinnule, while giving to these plants a peculiar character, unite them much more intimately with *Cheilanthes*, than with *Allosorus*, to which genus M. Presl refers them."—Of this I have seen no authentic specimen, and am unable to refer it from the description to any known species.

61. Ch. *viridis*, Sw.; "fronds bipinnate, pinnules ovate entire, terminal ones larger ovato-lanceolate or subhastate, stipes smooth." *Sw.*—*Sw. Syn. Fil. p.* 127. *Willd. Sp. Pl.* v. *p.* 456. Adiantum viride, *Vahl, Symb. p.* 104. Pteris viridis, *Forsk. Arab. p.* 186. Allosorus hastatus, *Pr.*

Hab. Arabia Felix, *Förskahl.*—I am unacquainted with this species, which Swartz and Willdenow refer to *Cheilanthes*, but which others refer to *Pteris*, and Presl, perhaps justly, considers identical with his *Allosorus hastatus* (*Pteris* Sw.)

62. Ch. *hirsuta*, Link; "frond tripinnate oblong in circumscription, pinnules lanceolate obtuse crenulate attenuated at the base, involucre breaking into a thin lax tomentum (indusio in tomentum tenue laxum abeunte) and covering the whole under side of the pinnules." *Link, Hort. Berol.* ii. *p.* 41; *Fil. Sp. Hort. Berol. p.* 63. *Kze. in Linnæa*, xxiii. *p.* 244. Othonoloma, *Link, olim. (Kze.)*

Hab. Mexico, (*Kunze*).—"Frond a foot and more long, pinnules 2—6 lines long, outer ones (externæ) very long, a little more than a line wide."—I am unacquainted with this plant, but Kunze retains it as a species of *Cheilanthes*, and Link says of it that it has the habit of *Pteris* and especially of *Pteris leptophylla*, Sw. (formerly *Cheilanthes spinulosa*, Link, according to Presl). Link further adds under this species, "*Ch. crenulata*, Hort. Ber. ii. p. 42, vix ab *Ch. hirsuta* diversa. *Ch. crenatam* quoque colimus; an *Ch. crenata*, Kze., Linnæa, ix. p. 84? Planta infans frondibus e cormo parum ultra poll. longis bipinnatifidis, pinnulis oblongis acutis crenatis et incisis in rachin alatam decurrentibus, stipite badio. Fructus nondum protulit. Habitus sequentis (*Ch. microphyllæ*, Sw.)"

63. Ch. *canescens*, Kze.; "frond coriaceous lanceolate pinnato-bipinnatifid, pinnæ sessile rather remote divergent oblong lower ones nearly opposite ovato-triangular superior alternate all deeply pinnatifid obtuse pubescent above carnohirsute beneath, laciniæ ovate or short-oblong obtuse, the

margin reflexed crenato-sinuate, teeth soriferous, indusia marginal membranaceous, sori minute at length spreading, rachis subflexuose and the ascending short stipes sparingly paleaceous pubescent pale, caudex creeping paleaceous." *Kunze, En. Fil. Mex. in Linnæa*, xiii. *p.* 143, *in Sckhuhr, Fil. Suppl. p.* 71, *t.* 35.

Hab. Mexico, *Ehrenberg.* — A very pretty and distinct species, judging from Kunze's figure, with an exceedingly pale straw-coloured stipes. The pinnæ very uniform, deeply pinnatifid with oblong segments, and in the principal figure at least having a continuous involucre like *Pteris* or *Allosorus*.

64. Ch. *aspera*, Hook.; roots densely tufted, stipites 2—3 inches long and as well as the main rachis and lower half of partial rachis ebeneous rough with minute points and partially scaly, scales pale ash-colour, fronds 4—4½ inches long lanceolate bipinnate subcoriaceous pale green, primary pinnæ distant below petiolate from a broad base ovato-acuminate, pinnate below pinnatifid above, pinnules and segments broad oblong when sterile, linear when fertile, entire or slightly auricled on each side at the base crenato-undulate towards the margin and there especially rough with short harsh white hairs often bi-tripartite or geminate, involucres continuous formed of the reflexed margins pale and membranous at the edges crenate and transversely undulate, on the ridges of the undulations the white rigid hairs are particularly apparent. (Tab. CVIII. A.)

Hab. Collected in an Expedition from Western Texas to El Caso, New Mexico, *Chas. Wright*, 1849.—This has a good deal the habit and general appearance of *Cheilanthes canescens* of Kunze, and has as much claim to be placed in the genus as that species, the continuous involucre being however that of *Pteris* or *Allosorus*. Our plant is much more delicate and graceful, the stipes and main rachises ebeneous, the primary pinnæ again truly pinnate. But the remarkable character exists in the transversely waved margin of the fertile pinnæ and segments, and the harsh rigid simple or bi- and sometimes tripartite white hairs seen on the ridges, especially of the undulations. It is assuredly a very distinct and new species.

65. Ch. *caudata*, Pr. "fronds bipinnate subtriangular glabrous, pinnules pinnatifid, lateral lobes roundish, terminal one linear, sori confluent, involucres obsolete, rachis and stipes glabrous." *Br. Prodr. p.* 156.

Hab. Tropical New Holland, *Brown.* — I have seen a specimen of this in the Banksian Herbarium, and know of nothing exactly corresponding with it: yet, without more specimens for examination I would not venture to describe it, or to say it is decidedly distinct. It has some affinity with small specimens of *Ch. tenuifolia*, but it has very elongated terminal pinnules, both at the main apex of the frond and on the branches. It may

safely be placed in the pteroid group of *Cheilanthes*: — the sori are sometimes distinct, more often continuous.

66. Ch. *intramarginalis*; roots tufted fibrous, stipites crowded 4—5 inches long scaly with black deciduous scales, below ebeneous as well as the rachis (which is downy on one side), fronds 4 inches to a span long deltoideo-ovate coriaceo-membranaceous pinnato-pinnatifid below bipinnatifid, pinnæ very patent remote opposite sessile dimidiately ovate acuminate the extremity long-caudate, lobes or segments linear or linear-oblong the upper ones decurrently confluent those on the lower half of the pinnæ the longest especially in the lowest pair where they are sometimes again pinnatifid, involucres broad membranaceous brown continuous (rarely interrupted) subcrenated transversely wrinkled. — Pteris intramarginalis, *Kaulf. in Schlecht. et Cham. Fil. Mex. Linnæa*, v. *p.* 613. *Kunze, Analect. Pteridogr. p.* 21, *t.* 17, *f.* 1. Allosorus, *Pr.* Pteris inframarginalis *et* Pt. fallax, *Mart. et Galeot. Fil. Mex. p.* 53. Cheilanthes Prionopteris, *A. Braun, MS.* (fide Kunzii). Cassebeera, *J. Sm.*

Hab. Mountains of Mexico, Xalapa, Oaxaca, Vera Cruz, &c.. *Schiede and Deppe, Karwinski, Martens and Galeotti, n.* 6329, 6389, *and* 6467, *Linden, n.* 40 *and n.* 1531. Guatemala, *Skinner.* — It is not unwillingly that I place this Fern, which has almost invariably continuous involucres (though thin and membranaceous, transversely wrinkled and more or less crenated) in *Cheilanthes*: but it has so close an affinity with our *Ch. nitidula* that I am unwilling to separate them generically. The general aspect is similar, the texture and venation (elevated beneath the frond), the opposite and here remarkable dimidiate pinnæ, and above all, the intramarginal insertion of the involucres (more striking in this species than in *Ch. nitidula*), are alike in both. Hence Kunze was led to observe of this, "fructificatio ab illa *Pteridis*, ubi sori et indusia margini contigua, paullisper recedit:" and in regard to Al. Braun having referred our present plant to *Cheilanthes*, he remarks "quamquam *Cheilanthes* firmis characteribus nondum nitatur, tamen nostram filicem illi adnumerare indusia continua et sori non discreti vetant." The habit is certainly rather that of a *Pteris*.— The serrated margin, distinct from the involucre, is well represented by Kunze in his 'Analecta Pteridographiæ,' and scarcely less correctly in Martens and Galeotti's *Pteris fallax*, which is assuredly identical with our plant, though that author does not seem to be aware of the existence of serratures in *Pt. intramarginalis*, the species immediately preceding his *Pt. fallax*.

67. Ch. *nitidula*; caudex short creeping stout, stipites 2—5 inches long very numerous and crowded hispid with subulate deciduous chaffy dark brown scales and as well as the rachis (which is downy on one side) ebeneous, frond 3—4 or rarely 5 inches long subdeltoideo-oblong acuminate (sterile ones broader) coriaceo-membranaceous pale green gla-

brous pinnato-pinnatifid below sub-bipinnate, pinnæ approximate nearly opposite broad-lanceolate dimidiate (the inferior half being broadest) deeply pinnatifid nearly to the rachis lowest pair again subpinnate and the secondary pinnæ pinnatifid, lobes all oblong entire or sinuate gradually coming to a sharp point the lower base decurrent the lowest inferior lobes the longest, involucres subintramarginal continuous rarely here and there interrupted broad flat membranaceous brown close-pressed frequently lobed and crenated and transversely wrinkled. *Hook. Ic. Pl.* x. *ined.* Pteris nitidula, *Wall. Cat. n.* 89. Allosorus nitidulus, *Presl.*

Hab. Kamaoun, *Dr. Wallich.* Rocks, Simla, *Dr. T. Thomson.* Pundkester, N. India, *Mr. Edgeworth.* — This, like many others we have placed under *Cheilanthes*, has nearly an equal claim to be considered an *Allosorus*, as it is considered by Presl, or a *Pteris*, according to Wallich, its discoverer. It has no small affinity with *Ch. pulchella* and *Ch. cuneata*, but is quite distinct from both, and apparently a rare species. We possess Dr. Wallich's original specimens from the alpine districts of Kamaoun, gathered by his collector, Mr. Blinkworth; others from Mr. Edgeworth, and we find excellent specimens in Dr. Thomson's rich Himalayan Herbarium. No description of it however has yet been published. In the younger fronds the veins are very obscure: in the older ones they are prominent or elevated beneath. Sterile fronds are broader and more membranaceous: hence Presl has placed it in a division of *Allosorus* "frondibus dissimilibus pinnulis laciniisve angustioribus integris," along with his *Allosorus* (Cryptogramma, *Br.*) *crispus*.—Dr. Wallich's specific name, we presume, refers rather to the glossy character of the stipites and rachis than to the fronds, which we find to be somewhat opaque.

(Pteroideæ,—*clothed with yellow powder beneath*).

68. Ch. *chrysophylla;* roots fibrous, stipites tufted 2—4 or 5 inches long purple-ebeneous hispid with sparse black subulate scales denser below, fronds subcoriaceous deltoid-ovate acuminate 3—4 inches long dark olive-green and glabrous above golden-yellow and powdery beneath pinnate, pinnæ mostly lanceolate the lowest pair deltoid all pinnatifid, lowest inferior segments of the lowest pinnæ lanceolate subsinuate, the rest oblong or ovate entire or crenulate, involucres formed of the reflexed margin of the frond continuous even to the apex of the segments but crenate, the edge thin membranaceous (not ciliated). Ch. chrysophylla, *Hook. Ic. Pl.* x. *t.* 901, *(ined.)*

Hab. Bare rocks, Kala-Panee, Khasya (1850), *Drs. Hooker and Thomson.* — It is impossible not to see the striking affinity between this species and the *Ch. farinosa*, Kaulf. (p. 77), and figured in the 'Icones Filicum,' t. 77, insomuch that, at the first aspect, save in the very different colour of the powdery substance on the underside of the frond (here bright gold)

the two might be considered identical. But independently of the crenated margin of the segments of the frond in the present *Cheilanthes*, the involucres will afford abundant marks of distinction; in *Ch. farinosa* wholly membranaceous rounded and more or less combined at the base (in that sense often continuous): here the involucres are formed of the reflexed margin of the frond itself and of the same texture, altogether continuous, but the edge membranaceous and merely crenated; never toothed or ciliated. It is the regular crenation that induces me to refer this and the following species to *Cheilanthes*, rather than to *Pteris* (or Allosorus), and assuredly among the latter genus I know of none that assimilates with this.

69. Ch. *ochracea;* roots fibrous, stipites crowded very short clothed with oblong obtuse spreading chaffy scales and as well as the rachis dark ebeneous purple, fronds submembranaceous broad-lanceolate scarcely a span long dark green slightly hairy above beneath densely clothed with a golden-ochraceous pulverulent substance pinnate, pinnæ almost always opposite lanceolate obtuse lowermost subdeltoid all of them pinnatifid nearly to the rachis, segments oval obtuse entire or obscurely crenate ciliated, involucres continuous narrow formed of the reflexed margin of the frond the edges membranaceous and crenated (not ciliated). *Hook. Ic. Plant. t.* 904, *ined.* Allosorus ochraceus, *Hook. in Benth. Plantæ Hartwegianæ, p.* 55.

Hab. Mexico; moist shady places, Morelia, *Hartweg, n.* 418. — In this very distinct Fern the involucre is narrow, continuous, and quite pteroid, but crenated, as if formed of originally distinct but confluent sori: so that, as will be seen in Mr. Bentham's work above quoted, my views were not quite decided whether to place it in *Allosorus*, *Nothochlæna*, or *Cheilanthes*. I am here led to refer it to the latter genus from many points of similarity with our last species, *Ch. chrysophylla*, in the similarity of involucres in the two, and especially in the presence of the golden powdery substance clothing the whole under surface of the frond. In the species now before us this pulverulent substance is so dense, the colour so approaching ochraceous, that it looks as if it had been smeared with that well-known paint, yellow-ochre, of a particularly bright hue. In the shape of the frond, too, lanceolate (not deltoid) this differs considerably from *Ch. chrysophylla*, and no less in the thinner and more membranaceous texture, in the villous upper side and ciliated margins, in the very short stipites, and above all the large spreading blunt chaffy scales which clothe the latter. I am not aware that this species has been detected by any person save Mr. Hartweg.

ADDENDA, &c.

At p. 74, n. 30, *for* "*Hypolepis Gardneri*, Hook.," *read* H. *monticola*, and add as a synonym, "Cheilanthes monticola, *Gardn. in Hook. Ic. Plant. t.* 477."

At p. 77, n. 3, under *Cheilanthes farinosa*, Kaulf., insert

Hab. *a.* and *β.*, both found at Simla, *Dr. T. Thomson.*

At p. 78, n. 5, under *Cheilanthes rufa*, Don, insert

Hab. Ascent of Mahadel, Chuma, in Khasya, *Drs. Hooker and Thomson;* less red than Dr. Wallich's specimens, and, on the under side of the frond, whitish.

At. p. 80, n. 6, under *Cheilanthes Dalhousiæ*, Hook., insert

Hab. Simla, *Dr. T. Thomson.*

At p. 81, n. 9, under *Cheilanthes fragrans*, Webb et Berth., insert

Hab. Peeshwar Hills, *Major Vicary.*

At p. 81, under *Cheilanthes squamosa*, n. 8, insert

Var. β.? *brachypus*, Kze. in Linnæa, xviii. p. 340; pinnæ and pinnules very obtuse subparallel hoary-villous above, the lower ones smaller, stipes very short. *Kze.* Ch. brachypus, *Kze. in Linnæa*, xxiii. *p.* 243 *and p.* 307.

β. Mexico, tropical, *Leibold.*—In the 'Linnæa' for 1844, this was given by Kunze, doubtfully, as a variety of *Ch. squamosa;* but subsequently, in 1850, it is considered by that author, a good species, though I am not aware if any specific character is published. Dr. Kunze observes of *Ch. brachypus*, l. c. "Cultura ex sporis repetita tamquam species propria probata. Ut varietatem *Ch. squamosæ*, dubie quidem, in describendis filicibus Leiboldianis (Linnæa, xviii. p. 340) plantam breviter exposui." — A specimen we possess from Kunze as this plant seems identical with our *Ch. squamosa;* but the stipes is rather shorter. Mexico is quite a new habitat for that species: and the same has likewise been found, with longer stipites at Sonsonati, Guatemala, by *Mr. Skinner;* and in Surinam by *Dr. Hostmann.*

At p. 82, after n. 9, should have been inserted

9.* Ch. *andina*, Hook.; caudex short rooting scaly, stipites tufted 1—2 inches long and as well as the main and partial rachis partially scaly dark ebeneous glossy, fronds 1½—2 inches long deltoideo-oblong subacuminate tripinnate subcoriaceous glabrous dark brown (when dry), primary pinnæ (especially the lower ones) distant deltoid-ovate, secondary ovate-oblong pinnatifid (rarely again and only those of the lower primary pinnæ) pinnate, lobes small rotundate entire or obscurely crenate, involucres formed of the inflexed margin of the lobules membranaceous or entire at the edge and more or less interrupted.

Hab. Lofty Andes of Peru, *John MacLean, Esq.* — A small and I must confess rather an obscure plant, possessing few or no satisfactory distinguishing characters, of a dingy brown colour in its dry state, with somewhat the aspect of *Ch. fragrans*, near which perhaps it might be placed. The whole plant does not exceed 3½ inches. Stipes and rachises very ebeneous black. Pinnules in 7—9 almost opposite pairs: the lowest pair distant, all glabrous, and all with an evident recurvature of the margin forming the involucres which are thin and membranaceous only at the edge. Sori rather large, so as to be by no means covered by the involucres.

At p. 84, under *Ch. microphylla*, in line 12, insert " (TAB. XCVIII. A.) "

At p. 98, under *Ch. Szowitzii; β. Stocksii*, insert " roots highly aromatic," and

Hab. Peshawur Hills, *Major Vicary.*

Dubious Species of Cheilanthes, *or to be removed from the Genus.*

Cheilanthes Sellowiana, *Pr. Tent. Pterid. p.* 160.

Ch. digitata, *Presl, in Herb. Meyen. et l. c. p.* 160.

Ch. Meyeniana, *Presl, in Herb. Meyen. et l. c. p.* 160.

Ch. auriculata, *Link et Kze. is* Allosorus, *Pr.*

Ch. hastata, *Kze. is* Pteris, *Sw.* Allosorus, *Pr.*

Ch. hastæfolia, *Schrad. is* Allosorus, *Pr.*

Ch. ferruginea, *Willd. is var. β. of* Notholæna rufa, *according to Presl, Reliq. Hænk.* i. *p.* 19.

Ch. candida, *Mart. et Galeotti, is* Nothochlæna.

Ch. contigua, *Wall. Cat. is* Onychium.

Ch. contracta, *Kze. is* Allosorus, *Auct.*

Ch. angustifolia, *H. B. K. is* Onychium, *according to Kze.*

Ch. crenulata, *Spr. is* Allosorus cæspitosus, *Pr.*

Ch. crenulata, *Link, according to Galeotti is* Allosorus ciliatus, *Pr.*

Ch. decomposita, *Willd. is* Allosorus angustifolius, *Pr. and* Onychium angustifolium, *Kze.*

Ch. heterophyllus, *Willd. is* Allosorus heterophyllus, *Pr.*

Ch. gracilis, *Kaulf. is* Allosorus, *Pr.*, Pteris, *Mich.*

Ch. macrophylla, *Kze. in Linnæa*, xxiii. *p.* 244, *et p.* 307, *is* Allosorus, *Pr.*

Ch. leptophylla, *Br. in Salt's Abyssinia, is* Onychium melanolepis, *Kze.*

Ch. *fuscata*, Bl.; " frond bipinnatifid membranaceous ferruginous with the stipes and rachis hairy, pinnæ alternate oblong obtuse pinnatifid, laciniæ digitato-pinnatifid, stipes brown. *Blume, En. Fil. Jav. p.* 136.

Hab. Moluccas, *Blume.*—" A *Ch. ferruginea*, Willd., laciniis digitato-pinnatifidis distincta."—We know no more of this plant than is given above. The *Cheilanthes ferruginea*, Willd. and Spreng. and Link and Kaulf., is considered by Presl and Kunze as identical with a variety of *Nothochlæna rufa*, Kaulf.

5. Cassebeera, *Kaulf.*

(Hook. Gen. Fil. tab. LXVI. A.) *Martius, Presl, and J. Smith, in part.* Adianti Sp., *Smith, Swartz.*

Sori subglobose or elliptical intra-marginal, frequently 2 confluent ones from as many veinlets on an emarginated lobe. *Involucre* inserted within the margin, of the same shape as the sorus, opening towards the costa, generally oblong or elliptical, membranaceous, brown, pressed down upon the sorus.—*Tropical or extratropical, small* Ferns *of* Brazil, *inhabiting dry rocky places, having a rather short, horizontal, densely scaly* caudex *or* rhizoma. Stipites *tufted, rather long in proportion to the fronds, ebeneous as well as the* rachises *and the* midrib *beneath.* Fronds *of a singularly thick, coriaceous, hard texture, quite glabrous, tripartite pedate or pinnate, even bipinnate, the* pinnæ *oblong or linear, simple and lobed or again pinnate, rarely and only below bipinnate, with the segments rotundate.* Veinlets *forked, quite internal, so that not a trace of them can be seen without dissection.* Sori *generally* 2 *combined (on the termination of* 2 *veinlets) on the lobules of those species which have trifoliate or simply pinnate fronds, so that each pinna bears as many sori as there are lobes: while in the bi- or (rarely tri)- pinnate species the pinnules bear but one simple or double sorus, though the involucre is sometimes cleft.*

The Genus *Cassebeera* was established by Kaulfuss upon a remarkable-looking Brazilian Fern, the *Adiantum triphyllum*, Smith; to which he added a new species, *Cassebeera pinnata*, equally from Brazil, and an undoubted congener. A third species of the Genus was detected by the late Mr. Gardner in the Diamond district of Brazil, and is figured in the 'Icones Plantarum,' under the name of *Cassebeera gleichenioides*, Gardn. In this the frond is more compound, but the habit and fructification are the same as in the other *Cassebeeræ*. Thus limited it is a natural and a good Genus. Presl however in his 'Tentamen Pteridographiæ' has placed in it the *Cheilanthes pteroides* of Swartz and the present work, which it must be confessed has considerable affinity in the fructification and in the texture of the frond, but not in habit. Mr. J. Smith takes another view of the Genus *Cassebeera* altogether; restoring indeed *Cass. pteroides* to *Cheilanthes:* but uniting with the original species of Kaulfuss, the *Pteris pedata* and *argentea*, Linn., *Pteris hastata* of Swartz, our *Cheilanthes intramarginalis*, together with *Cheilanthes farinosa, cuneata, microphylla, tenuifolia* &c. of authors and of this work: so different are the opinions of botanists who have most devoted attention to the Family, on the subject of Genera of Ferns. Few however are more guided by attention to natural affinities than Mr. J. Smith: and he says "On comparing the Adiantoid section

of *Pteris*, and part of *Cheilanthes* with the original species of *Cassebeera*, I find that several of the species of both these Genera (*Pteris* and *Cheilanthes*) so well agree in habit and in structure of the sori, that I have been induced to place them under *Cassebeera*." Martius in his admirable illustration of *Cass. pinnata* (Ic. Plant. Crypt. Brasil. p. 91, tab. 61) dwells wholly upon its distinction from *Adiantum* and *Lindsæa*, with which it has little in common. It may be very difficult to define the Genus accurately in words; but I am clearly of opinion that if retained at all, and no one seems to doubt the propriety of so doing, it should be restricted to the original species:—if abolished it would be difficult to say which of the established Genera should receive them. I cannot agree to the observation of Presl, "Genus hoc (*Cassebeera*) magis artificiale quam naturale est."

* *Fronds digitate or pedate.*

1. Cass. *triphylla*, Kaulf.; frond tripartite or digitatedly pedate, segments lanceolate crenato-lobate.—*Kaulf. Enum. Fil. p.* 216. *Hook. Gen. Fil. t.* 66, A. Adiantum triphyllum, *Smith, Ic. ined. t.* 74. *Swartz, Syn. Fil. p.* 120. *Willd. Sp. Pl.* v. *p.* 428.

Hab. Buenos Ayres, *Commerson*. Monte Video and South Brazil, *Sellow, Isabelle, Tweedie*. Porto Alegre, *Mr. Fox*, (*in Herb. nostr.*)—It is quite a mistake in those who have described this Fern as if it were triphyllous, or trifoliolate, or ternate: so far from there being 3 distinct leaflets or pinnæ, the normal form I suspect to be pedate, that is deeply divided into 3 segments (or tripartite), with the lateral segments again divided, but never into separate pieces. The true nature of this frond is given at t. 66, A., of our 'Genera Filicum,' in the more usual form of the plant, when the lower lateral segments are suppressed: but there are never distinct leaflets or pinnæ as in the following species.—The caudex is stout, horizontal, 2 inches long, clothed with subulate, black, glossy scales; on the underside with numerous descending wiry fibrous roots; above throwing up many crowded, wiry, almost black, ebeneous, flexuose stipites, 3—6 inches long, terminated by the, usually, deeply tripartite, small, coriaceous frond. When dried without pressure, the sides are apt to be revolute, and narrow: when perfect the segments are exactly lanceolate lobato-crenate: less frequently the lower side of the lateral lobes or segments sends down a lobe, constituting a pedate frond. The colour when dry is a pale brown, traversed in every one of the lobes, for about half its length, by an intensely black, shining costa, which gradually becomes fainter, till it entirely disappears. In the young and thinner fronds, when held up between the eye and the light, and with the aid of a lens, the forked rather closely placed lateral veins, or veinlets, may be seen, from 2 to 4 terminating under each involucre, according to the size of the lobe bearing the involucre, or to the size of the involucre itself which covers them. I cannot find that of the sori there are, as Presl and others express it, constantly, "duo sub qualibet crena emarginata frondis," though it is very common for the lobe or lobule which bears the sori to be emarginate.

** *Fronds pinnate or bipinnate.*

2. Cass. *pinnata*, Kaulf.; frond pinnate, lower pinnæ again divided or pinnated, pinnules petiolate elongated linear-oblong acute crenato-lobate, lobes broad generally emarginate (duplicato-lobate).—*Kaulf. Enum. Fil. p.* 217, *t.* 1, *f.* 11. *Martius, Ic. Plant. Crypt. Bras. p.* 91, *t.* 61. *Kunze, Analecta Pteridograph. p.* 37, *t.* 24. *Spreng. Syst. Veget.* iv. *p.* 118.

Hab. South Brazil. Province of St. Catherine, *Chamisso, Sellow.* Minas Geraes, *Langsdorff.* Stony shady places, Province of St. Paul, Brazil, Serra de Natividade, *Gardner, n.* 3556.—A much larger, stouter and more robust plant than *Cassebeera triphylla.* The caudex is similarly horizontal, bearing the same wiry roots. The stipites are less crowded; the rachis a span to a foot long, less glossy and ebeneous than the preceding species. The frond is simply pinnated, as shown by Kaulfuss and Kunze and as in our specimens from Natividade: but not unfrequently bipinnate, as represented by Martius, and as in our specimen from Sellow. The pinnæ and pinnules are 2 inches and 2½ inches long: and the black midrib runs up almost to the apex. In our best specimen from Gardner the scales of the caudex are bright tawny.

3. Cass. *gleichenioides*, Gardn.; fronds bipinnate, pinnules petiolate linear-elongated deeply pinnatifid or even pinnated, lobes or ultimate pinnules orbicular-subquadrate when dry recurved the margin (beyond the involucre) thickened entire. —*Gardn. Plant. Exsicc. Bras. n.* 5295. *Hook. Ic. Plant.* vi. *t.* 507.

Hab. Bushy rocky places, Diamond district, Brazil, *Gardner, n.* 5295. —Imagine an unusually large specimen of *Cass. pinnata* more divided (*i. e.* more bipinnated than usual), and instead of having the shallow lobes to that species, to have those lobes, or the sinuses of those lobes, cut down to the very rachis into roundish lobes or ultimate pinnules with the margin or edges of those pinnules thickened, and you have an idea of the structure of the present species. The scales of the caudex of this as well as of the preceding species, are bright tawny, not black as we find them in *Cass. triphylla.* Our tallest fronds of this are 6—7 inches long, and the deeply divided, convex and nearly opposite ultimate pinnules of a rounded form, have quite the appearance peculiar to some *Gleicheniæ*, whence Mr. Gardner's appropriate specific name. We find the capsules upon long stalks, which seem to be characteristic of the other species. Although this is found in tropical Brazil, it is probably a mountain plant: and all the species may be said to belong to the temperate rather than tropical regions.

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* (At p. 108, line 4, for *Allosorus pulchellus*, read *All. decompositus*).

6. Onychium, *Kaulf.*

(Hook. Gen. Fil. tab. XI.) Leptostegia, *Don.* Cheilanthis Sp., *Wall. H. B. K.* Pteridis Sp., *Hook. et Grev. Desv.* Trichomanis Sp., *Thunb.* Lomariæ Sp. Scolopendrium, *Hamilton.*

Sori linear, placed opposite each other, on each side of a midrib of the segment or pinnule and at or near the margin, or rather the margin of the pinnule is often suddenly rolled in and there bears the involucre, giving an appearance of the margin being extended beyond the involucre; these sori are inserted upon a linear receptacle running within the fold of the margin. *Involucres* linear, and being opposite, and each occupying nearly the whole space between the rachis and the margin, they have the appearance of opening in the middle by a longitudinal suture; white or yellow, membranaceous.—*Tropical or subtropical* Ferns. Roots *fibrous, tufted.* Fronds *stipitate, varying in size, decompoundly pinnatifid, the primary divisions narrow,* 1*-nerved, the fructified portion broader and penniveined, the veins simple, extending to the longitudinal receptacle which bears the capsules, and confluent with it.*

In the Genus now under consideration we have examples, among the suborder *Pterideæ*, of plants with fructification bordering more closely upon the normal state of *Pteris* and *Lomaria;* that is, continuous and not broken up into scales, or not deeply crenated and jagged at the margin: but each fertile lobe or pinnule has its margin occupied by an uninterrupted sorus and involucre. Kaulfuss however selected two species which have a peculiar habit, copiously ramified with narrow divisions, the ultimate segments narrow and tapering like a claw (ὄνυχιον) bearing the involucres so opposite to each other and so close that they almost appear like one, opening in the middle (as in *Scolopendrium*), and to these he gave the generic name of *Onychium.* His species are *O. auratam,* Kaulf. (Pteris chrysocarpa, *Hook. et Grev. Ic. Fil. t.* 107, and *O. Capense*—incorrect as to locality (Trichomanes Japonicum, *Thunb.*). These Presl has caused to merge into his *Allosorus*, and in the groupe or division having "frondes dissimiles." With the exception of Presl, our writers on Ferns have considered the Genus worthy to be retained, and with little or no modifications. Don, indeed, before Kaulfuss' 'Enumeratio' could have reached his hands, formed a new Genus, *Leptostegia,* from the *Scolopendrium lucidum,* Hamilton, MS., and this is a congener of *Onychium.* Kunze has extended the Genus by uniting with it the *Cheilanthes angustifolia,* H. B. K., *Lomaria microptera,* Br. in Herb. Carmich., *O. melanolepis,* Kze. (Cheilanthes *leptophylla, Br. in Salt's Abyssinia*), and a new species from Cuba, *O. strictum.*

1. O. *auratum*, Kaulf.; roots of densely tufted fibres, stipites cæspitose a span to a foot and more long hispid with a few narrow scales only at the base and as well as the rachises everywhere pale brown or straw-colour glabrous and glossy, frond a span to a foot or a foot and a half long ovato-lanceolate acuminate submembranaceous but firm and glossy very compound four times or more pinnatisected (primary and secondary divisions pinnated) segments all narrow linear subcuneate short (in the sterile portions) ultimate ones acute entire or inciso-dentate, segments all pointing upwards 1-nerved, fertile segments elongated siliquiform especially the terminal ones and mucronate, sori linear-elongated occupying the whole back of the fertile segments, involucres golden colour meeting at their edges. *Kaulf. Enum. Fil. p.* 144. Lomaria aurea, *Wall. Cat. n.* 38. L. caruifolia, *Wall. Cat. n.* 39. L. decomposita, *Don, Prodr. Fl. Nep. p.* 14. Pteris chrysocarpa, *Hook. et Grev. Ic. Fil. t.* 107. Pteris siliculosa, *Desv.* Allosorus auratus, *Presl.*

Hab. East Indies and Malay Islands. Manilla, *Chamisso.* Luzon, *Cuming, n.* 38; *Thos. Lobb, n.* 452. Java, (ex Herb. Miquel. n. 21). Bootan, *Griffith, Booth.* Nepal, Kamaon (probably its western limits), *Hamilton, Wallich.* Khasya, *Simons, n.* 246; *J. D. Hooker, and Dr. T. Thomson.*— Our figure in 'Icones Filicum,' above quoted, does ample justice to this plant as far as an entirely fructified specimen is concerned, and it is certainly one of the most beautiful of Ferns, whether in that or in the sterile state (of which latter we now possess copious specimens), when the fronds have quite a different appearance, being everywhere multifidly cut into copious, crowded, narrow, short and linear or somewhat cuneated segments, tapering at the base, and resembling the very compound leaf of some umbelliferous plant (whence Dr. Wallich's name *caruifolia*). Other specimens again are partly (above) fertile after the manner of *Osmunda regalis* or *Allosorus* (Ceratodactylis, *J. Sm.*) *Karwinskii* of Kunze, and apparently by a transformation of the laciniæ of the pinnæ and pinnules, which become larger, more elongated, entire and mucronated, often an inch long, and so resembling the pods of some *Arabis* as to suggest to Desvaux the specific name of "*siliculosa.*" The under side of these is a beautiful golden colour, but less deep in our specimens from Khasya and the Malay Islands, in consequence, probably as Mr. J. Smith suggests, of the moister climate.

I quote Don's *Lomaria decomposita* with doubt, because he not only does not notice the remarkable colour of the fructifications, but because he distinguishes his *Leptostegia lucida* generically from this plant, whereas no botanist could see these two species without pronouncing them to be identical as to Genus. The usual colour of the fronds, especially the sterile fronds, of our plant, is to be pale light yellow-green (when dry), but we have specimens from Assam with very dark foliage and with narrower and more elongated segments.

2. O. *lucidum*, Spreng.; caudex creeping? stipites six

inches to a foot and more long and as well as the rachises pale brown or stramineous, frond a foot and more long ovato-acuminate membranaceo-coriaceous glossy 3—4 times pinnatisected (primary and secondary divisions pinnated) segments uniform or nearly so in the sterile and fertile ones, all narrow linear a little tapering below ultimate ones moderately long all gradually acuminated (not mucronate even in the fertile ones), sori oblong short occupying nearly the whole of the back of the segments, involucres white or cream-colour membranaceous meeting at the back. *Spreng. Syst. Veget.* iv. *p.* 66. *Hook. Gen. Fil. t.* xi. Cheilanthes lucida, *Wall. Cat. n.* 69. Cheilanthes contigua, *Wall. Cat. n.* 69. Leptostegia lucida, *Don, Prodr. Fl. Nep. p.* 14. Scolopendrium lucidum, *Hamilton's MS. (fide Don).*

Hab. East Indies and Kamaon, Nepal, *Hamilton, Wallich, Lady Dalhousie, Dr. T. Thomson, Strachey and Winterbottom* (elevation 700—7500 feet), *n.* 1, 2. Mussoorie and Gurwal, *Dr. T. Thomson.* Simla, *Lady Dalhousie, Edgeworth, Griffith.* Mishmee, *Griffith.* Khasya, *T. Lobb.*—In the sterile specimens of this plant, there is a great resemblance to those of the preceding (*O. auratum*), but the fronds, though varying much in size, are generally broader in proportion to their length, with commonly more spreading pinnæ and the ultimate segments more entire. In fructification the differences are very apparent: the sori being formed on the unchanged segments, they are consequently very small in comparison, short, oblong, and of a pale white or cream-colour, never golden coloured. The *Cheilanthes contigua* of Dr. Wallich has the fronds a little broader and the segments narrower, and they form no permanent or tangible variety.

Kaulfuss' representation of a fertile portion of the frond of his *Onychium Capense* (O. Japonicum, *Kze.*, our next species) is a faithful representation of our plant.

3. O. *Japonicum*, Kunze; "fronds flexuose decompound, branches triplicato-pinnate, the segments oblong acute." *Kaulf.* — *Kunze, in Schkuhr, Fil. Suppl. p.* 11. Onychium Capense (*omitting the station, "Cape of Good Hope"*) *Kaulf. Enum. Fil. p.* 145, *t.* 1, *f.* 8. Trichomanes Japonicum, *Thunb. Fl. Jap. p.* 340. Cœnopteris, *Sw. Syn. Fil. p.* 89.

Hab. Japan, in Kosido, Satsuma, Nagasaki and elsewhere, in mountain districts, *Thunberg.*—"Frond a foot and a half and more long, weak, flexuose, decompound, above triplicato-pinnate, the apex subcaudate. Branches very remote, slender, triplicato-pinnate, pinnules dentato-laciniate, the segments oblong acute bearing the fructification. Sori inserted at the margin of the laciniæ under the apex in the sinus of the indusium. Indusia submarginal, membranaceous, white, connivent (limbis conniventia), at length opening with a longitudinal suture."—With this species I am unacquainted, except from the description, and from the figure of Kaulfuss, which shows an apex of a branch, which, as already observed under *O. lucidum*, seems in no way different from that plant. Schlechtendal, in his 'Adumbr. Fil. Promont. Bon. Sp.' p. 40, expressed his suspicion that the *Onychium*

Capense of Kaulfuss was not of African origin. Kunze, in 'Linnæa,' x. *l. c.* observed that "he had seen a specimen of Kaulfuss' *O. Capense* in Roemer's Herbarium, found by Thunberg," and, afterwards, having ascertained that it was from Japan, and in reality Thunberg's *Trichomanes Japonicum*, he very properly restored that specific appellation. It is now a question whether our *O. lucidum*, like many other northern Indian forms, may not extend its range as far as Japan. Thunberg's description, brief as it is, would seem to confirm such an opinion. "Frons supra decomposita glabra, stipite torto sulcato. Pinnulæ ultimæ acutæ subtrifidæ. Fructificationes solitariæ in ultimis laciniis; membrana tegens tenuissima alba." *Thunb. l. c.*

4. O. *angustifolium*, Kunze; "fronds bipinnate, pinnules linear acuminate sessile entire and as well the rachis glabrous." *H. B. K. Kunze, in Schkuhr, Fil. Suppl.* ii. *p.* 11. Cheilanthes angustifolia, *H. B. K. Gen. et Sp. Am.* i. *p.* 17. *Spreng. Syst. Veget.* iv. *p.* 116. *Presl.* Ch. decomposita, *Willd. Suppl. (according to Sprengel).*

Hab. Mexico, on the Mountain Jorullo, at between 3000 and 4000 feet of elevation.—"Fronds 4 inches and more long, bipinnate; pinnæ alternate, 2 inches long. Pinnules linear, acuminate, sessile, entire, glabrous, an inch and a half to two inches long, scarcely a line wide, lower ones sometimes bipartite, middle nerve prominent beneath, naked. Universal and partial rachises glabrous, naked, somewhat winged, greenish. Stipes 8 inches long, naked, nearly terete, castaneous, shining. Sori marginal, at length confluent. Sporangia cinnamon-brown. Indusium continuous, arising from the margin of the frond, fimbriato-crenate, diaphanous, glabrous. Perhaps a species of *Pteris*."—I am not acquainted with this plant, which Kunze refers to *Onychium;* but I am not aware that any further information is given respecting it, beyond what I have here copied from Humboldt.

5. O. *strictum*, Kunze; caudex 2—3 inches long oblique rather stout nodose throwing out wiry roots more copiously from the upper extremity, stipites numerous partially scaly a span to a foot long crowded from the apex of the caudex and as well as the slender rachises pale straw-colour glossy, fronds a span long submembranaceous green glabrous opaque ovate decompoundly pinnatisected, the segments all very narrow and acute opposite entire or bi-trifid subcuneate, tertiary rachises winged: the fertile laciniæ are a little larger and wider sharply acute bi- or trifid beyond the fructification, bearing the sori on the disk short linear-oblong nearly white. —*Kunze, in Schkuhr's Fil. Suppl.* ii. *p.* 11.

Hab. St. Jago de Cuba, on Mount Leban, *Linden*, *n.* 1870.—This is a very distinct and well marked species, and with all the characters of *Onychium*, which is thus found in the New as well as the Old World. The caudex or rhizoma of my specimen is singularly nodose or tuberculated, and one that apparently elongates upwards and bears the fronds altogether from the extremity. It is remarkable for the great length of the stipites in

comparison of the fronds, and for the opposite segments, of which the ultimate ones have one or two or three sharp points. Involucres small but swollen, as it were, from the copious capsules of the sori.

6. O. *melanolepis*, Dcne.; caudex short a little creeping with rigid and appressed black scales, stipites tufted from the apex of the caudex 3—6 inches long very slender and as well as the rachises flexuose canaliculated glabrous glossy stramineous (when dry), frond membranaceous 3—6 inches long veined glabrous pale green ovate tripinnato-pinnatedly-sected sterile laciniæ narrow cuneate tri-quinquefid and incised, the lacinulæ sublinear apiculate, fertile ones oblong cuspidate bearing the pale membranaceous almost white involucres on the disk, the apex acute free entire. — *Decaisne, Pl. de l'Arabie Heur. Archiv. du Mus.* ii. *p.* 189. *Kze. Schkuhr, Fil. Suppl.* ii. *p.* 9, *t.* 104, *f.* 2. *Hook. Ic. Plant.* x. *t.* 9. Cheilanthes leptophylla, *Br. in Salt's Abyssinia, App.* iv. *p.* lxv. *(name only).* Allosorus cuspidatus, *Jaubert et Spach, Illust. Pl. Orient.* iii. *p.* 1, *t.* 201.

Hab. Abyssinia, *Salt, H. Schimper, n.* 1672. South Persia, rock of Mount Pire-zend, between Shiraz and Kazeroum, *Aucher-Eloi, n.* 5488. Caves in the Island of Kareh, Persian Gulf, and at Dalechy, *Kotschy, n.* 10 *and* 198.—A small and very distinct species, long known to that Chief of Botanists, Mr. Brown, and named by him, without description, in the Appendix to Salt's Abyssinian travels. More recently it has been taken up and both described and figured by continental botanists, 1st, as *Allosorus melanolepis*, Dcne.; and 2ndly, as *Allosorus cuspidatus*, Hochstetter. By Kunze it has been properly referred to *Onychium*. It is a plant of very delicate texture, like unusually slender specimens of *Gymnogramma leptophylla.*

O. Krebsii, *Kunze, in Linnæa,* x. *p.* 504, from Graham's Town, South Africa, proves to be a *Scolopendrium*, according to the same author, on an examination of more perfect specimens, and the error has since been corrected in the 18th volume of the 'Linnæa,' and in the Supplement to Schkuhr's 'Filices,' where it is figured and described as *Scolopendrium Krebsii.*

O micropterum, *Hook.* — Under this name, in the 'Genera et Sp. Fil.' I referred to a plant of the late Capt. Carmichael in my Herbarium, bearing the name of *Lomaria microptera*, Br. (MS.) It is with regret I am compelled to say that the plant is no longer to be found in my Herbarium, accidentally mislaid probably: so that I am unable to describe it and to offer any further opinion respecting it. Kunze includes it in his Catalogue of the species of *Onychium;* but only on the above authority.

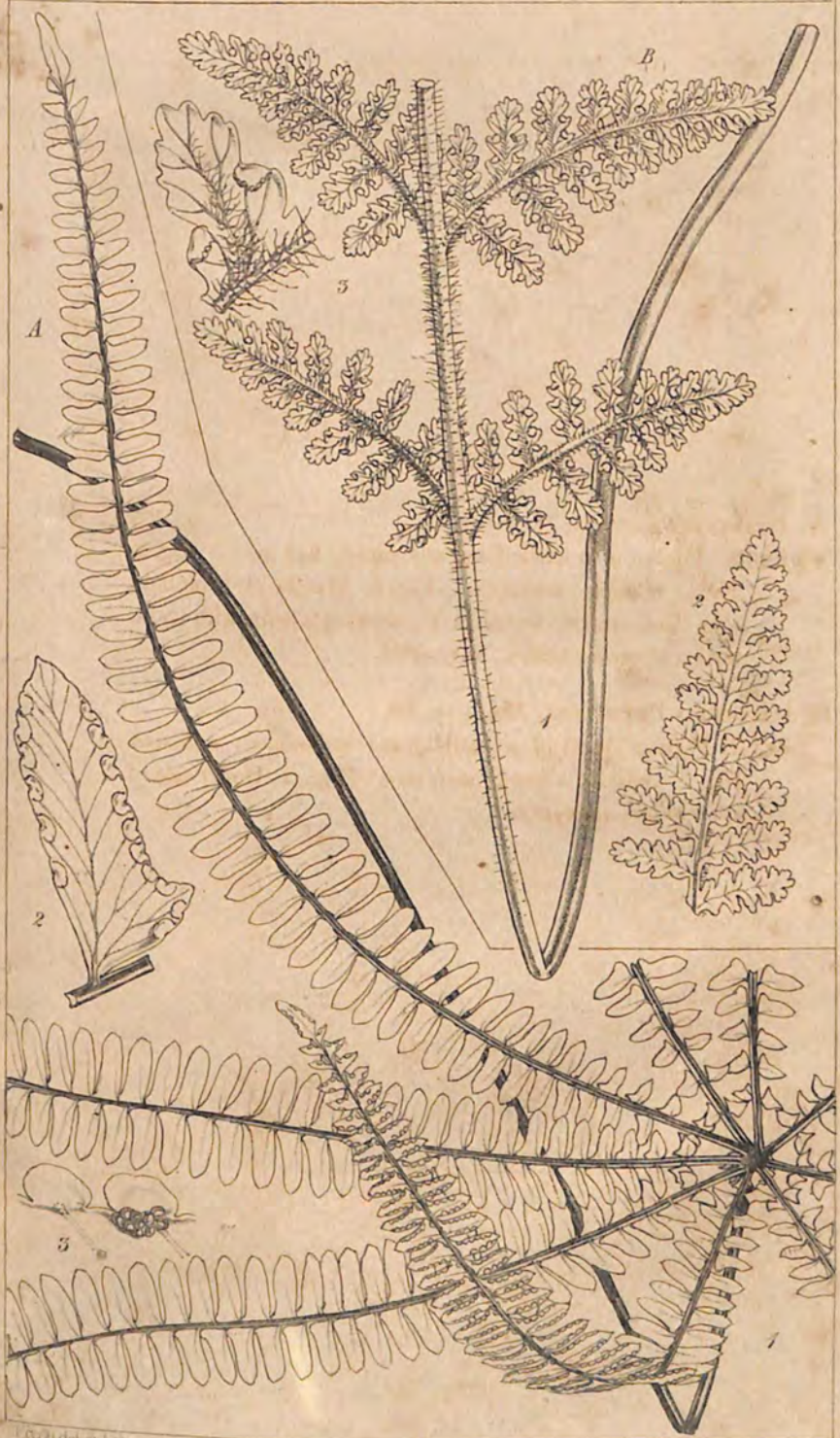
Tab. XCI.

A. Hypolepis radiata, *Hook.*—p. 72.

Fig. 1. Portion of a fertile frond and stipes; *nat. size.* Fig. 2. Fertile pinnule; *magnified.* Fig. 3. Margin of a pinnule, with the involucres forced back; showing a sorus with its insertion upon the nerves; *magnified.*

B. Hypolepis Purdieana, *Hook.*—p. 69.

Fig. 1. Portion (base) of a fertile frond and stipes; *nat. size.* Fig. 2. Apex of a frond; *nat. size.* Fig. 3. Under side of a fertile lobe; *magnified.*



Pamplin. Imp

Tab. XCII.

A. Hypolepis pedata, *Hook.*—p. 73.

Fig. 1. Frond and stipes (fertile); *nat. size.* Fig. 2. Under side of a fertile pinnule; *magnified.*

B. Hypolepis monticola, *Gardn.* (H. Gardneri, *Hook., supra,* p. 74).

Fig. 1. Fertile fronds; *nat. size.* Fig. 2. Under side of a fertile pinnule; *magnified.*

Fitch delet lith

Partridge Imp

Tab. XCIII.

A. Pteris scaberula. *A. Rich.* (Allosorus scaberulus, *Presl*).
Fig. 1. Sterile primary pinna; *nat. size.* Fig. 2. Fertile primary pinna, seen from beneath; *nat. size.* Fig. 3. Apex of a fertile frond, seen from beneath; *nat. size.* Fig. 4. Fertile pinnule, seen from beneath; *magnified.*

B. Cheilanthes viscosa, *Link.*—p. 104.
Fig. 1. Frond and stipes, (fertile); *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

Fitch del et lith.

Pamphlin. imp.

Tab. XCIV

A. Cheilanthes pulchella, *Bory.*—p. 109.

Fig. 1. Frond and stipes (fertile); *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. Cheilanthes Szovitzii, *Fisch. et Mey.*—p. 98.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Portion of a fertile primary pinnule, seen from beneath; *magnified.*

A
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Tab. XCV.

A. Hypolepis anthriscifolia, *Pr.*—p. 66.

Fig. 1. Portion of a fertile frond; *nat. size.* Fig. 2. Fertile pinnule or ultimate segment, seen from beneath; *magnified.*

B. Hypolepis Millefolium, *Hook.*—p. 68.

Fig. 1. Caudex and lower portion of stipes; and Fig. 2. Portion of a fertile frond; *nat. size.* Fig. 3. Fertile pinnule or ultimate segment, seen from beneath; *magnified.*

C. Hypolepis distans, *Colenso.*—p. 70.

Fig. 1. Caudex and stipes; and Fig. 2. Portion of a fertile frond; *nat. size.* Fig. 3. Fertile pinnule, or ultimate segment of a frond, seen from beneath; *magnified.*

Fitch, del et lith.

Pamplin Imp.

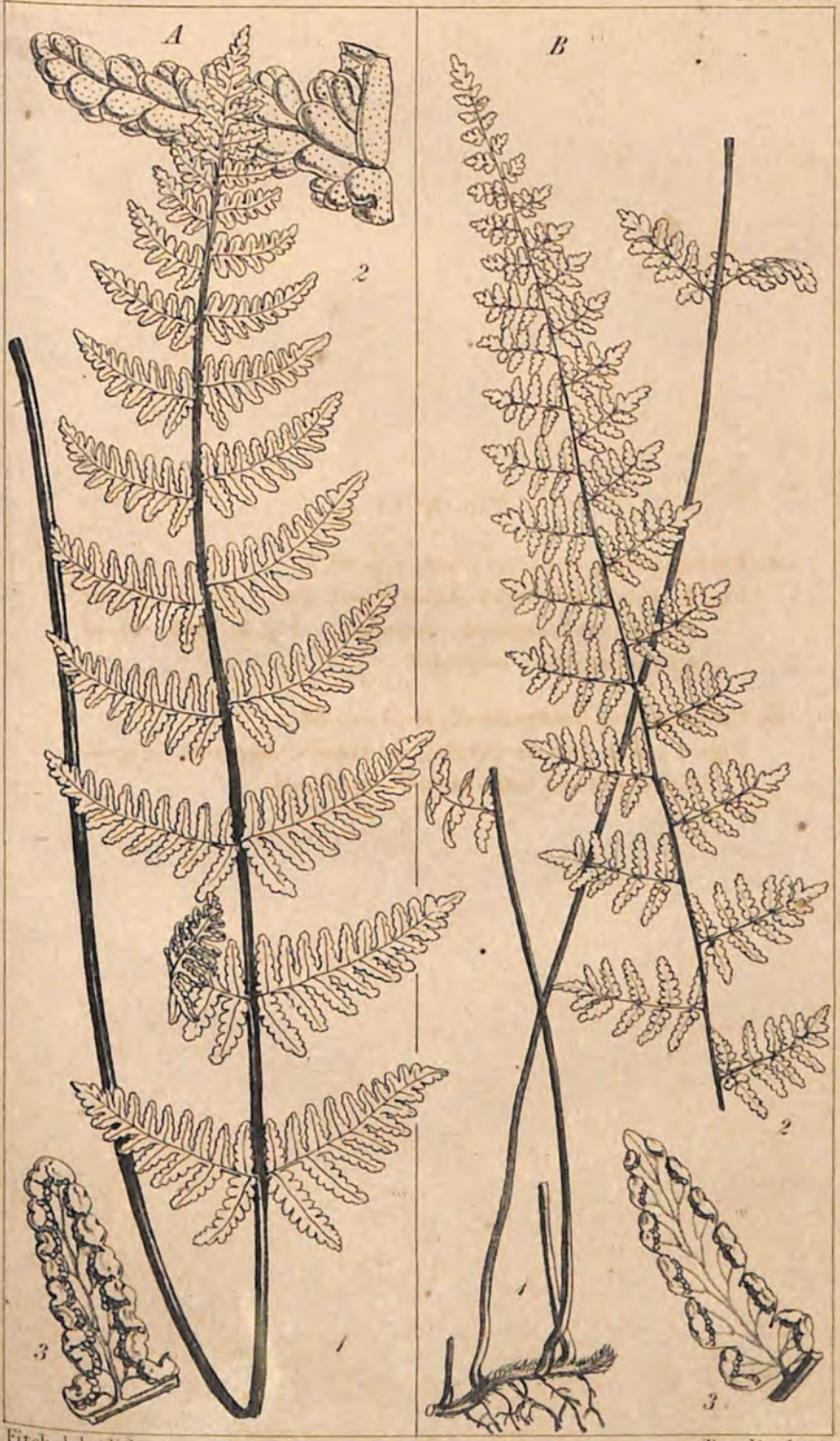
Tab. XCVI.

A. Cheilanthes bullosa, *Kunze.*—p. 88.

Fig. 1. Frond and stipes (fertile); *nat. size.* Fig. 2. Upper side of a fertile segment; *magnified.* Fig. 3. Under side of a fertile segment; *magnified.*

B. Cheilanthes Tweedieana, *Hook.*—p 84.

Figs. 1 and 2. Fronds (fertile) and stipites; *nat. size.* Fig. 3. Under side of a fertile pinnule; *magnified.*



Fitch del et lith.

Pamplin Imp

Tab. XCVII.

A. Cheilanthes Seemanni, *Hook.*—p. 85.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Ultimate pinnule (fertile); *nat. size.*

B. Cheilanthes Sieberi, *Kunze.*—p. 83.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Pinnule (fertile), seen from beneath; *magnified.*

Fitch del et lith

Pamplin Imp

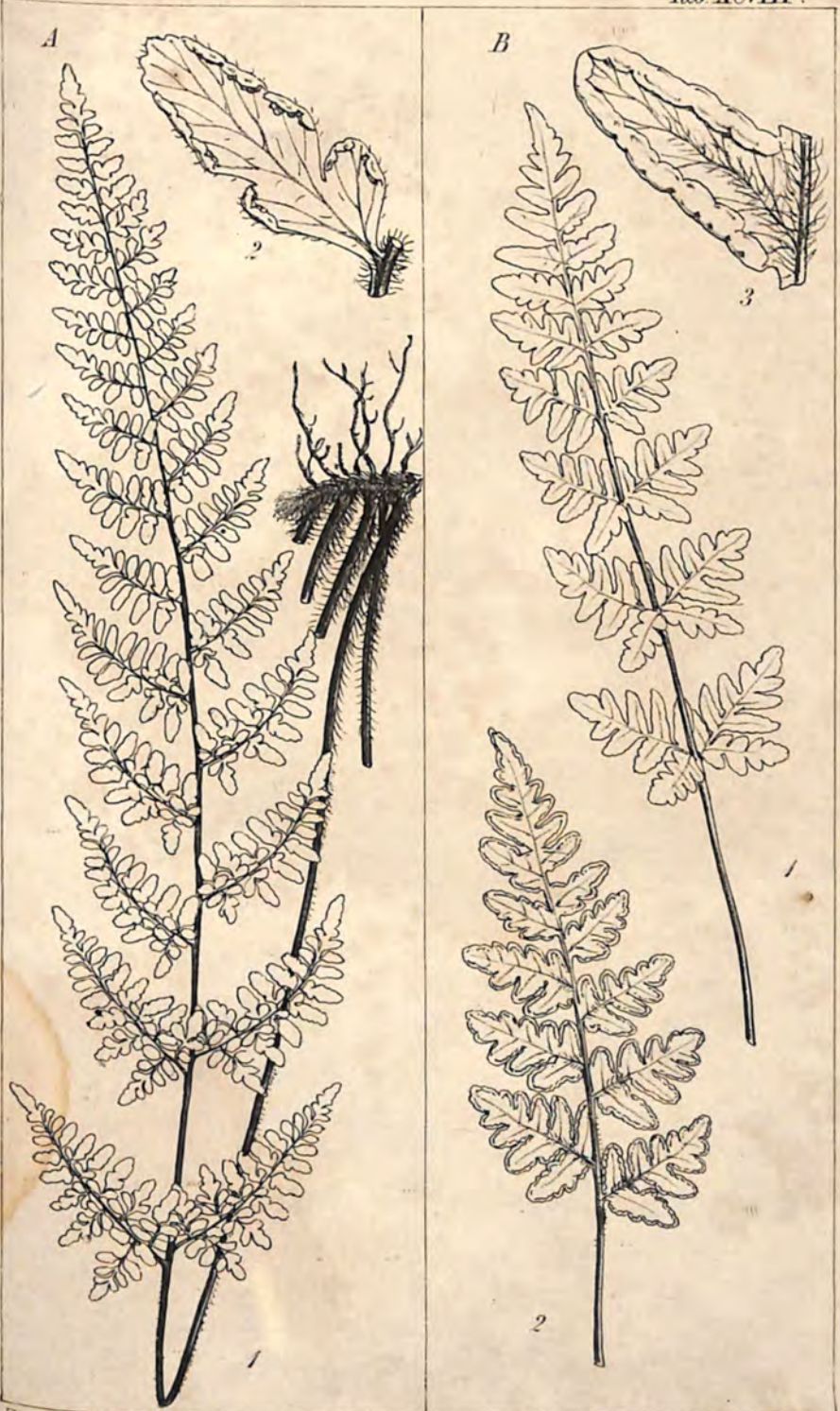
Tab. XCVIII.

A. Cheilanthes microphylla, *Sw.*—p. 84; (reference to the figure there inadvertently omitted).

Fig. 1. Plant (fertile); *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. Cheilanthes subvillosa, *Hook.*—p. 87.

Figs. 1. and 2. Upper and under side of a fertile frond; *nat. size.* Fig. 3. Fertile segment, seen from beneath; *magnified.*



Fitch del et lith.

Pamplin Imp.

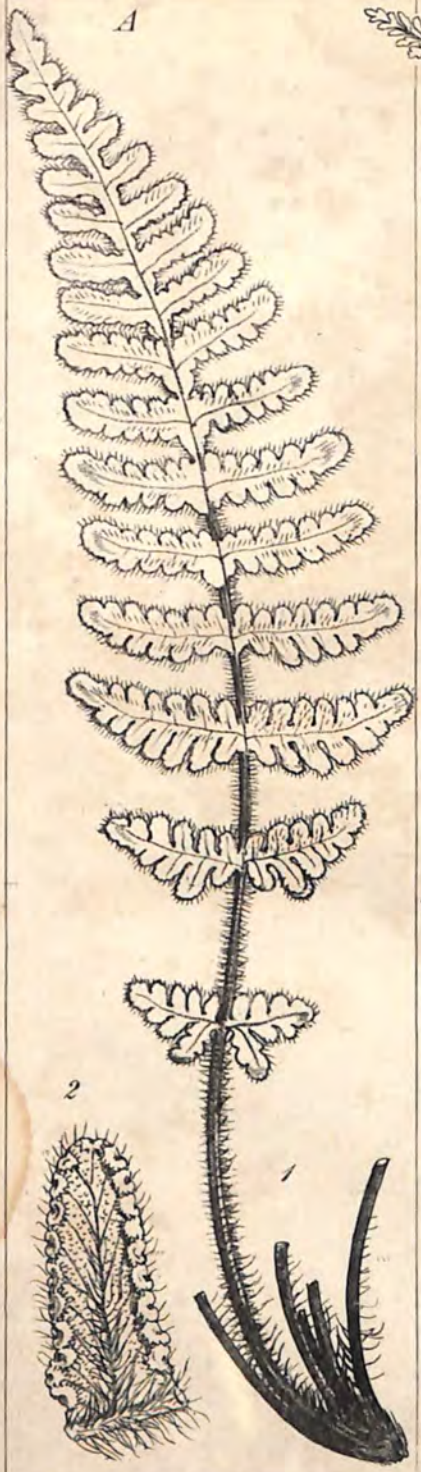
Tab. XCIX.

A. Cheilanthes rufa, *Don.*—p. 79.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile segment, seen from beneath; *magnified.*

B. Cheilanthes Moritziana, *Kunze.*—p. 85.

Figs. 1. and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Pinnule (fertile), seen from beneath; *magnified.*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1
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Tab. C.

A. Cheilanthes Mysurensis, *Wall.*—p. 94.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. Cheilanthes multifida, *Sw.*—p. 90.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.*

Fitch del et lith

Pamplin Imp.

Tab. CI.

A. Cheilanthes pteroides, *Sw.*—p. 80.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Portion of a fertile pinnule, seen from beneath; *magnified.*

B. Cheilanthes hirta, *Sw.*—p. 92.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.* Fig. 4. Portion of a frond of var. *β.*; *nat. size.*

Fitch del et lith

Pamplin imp

Tab. CII.

A. Cheilanthes induta, *Kunze.*—p. 92.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. Cheilanthes dichotoma, *Sw.*—p. 104.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Ultimate fertile pinna, seen from beneath; *magnified.*

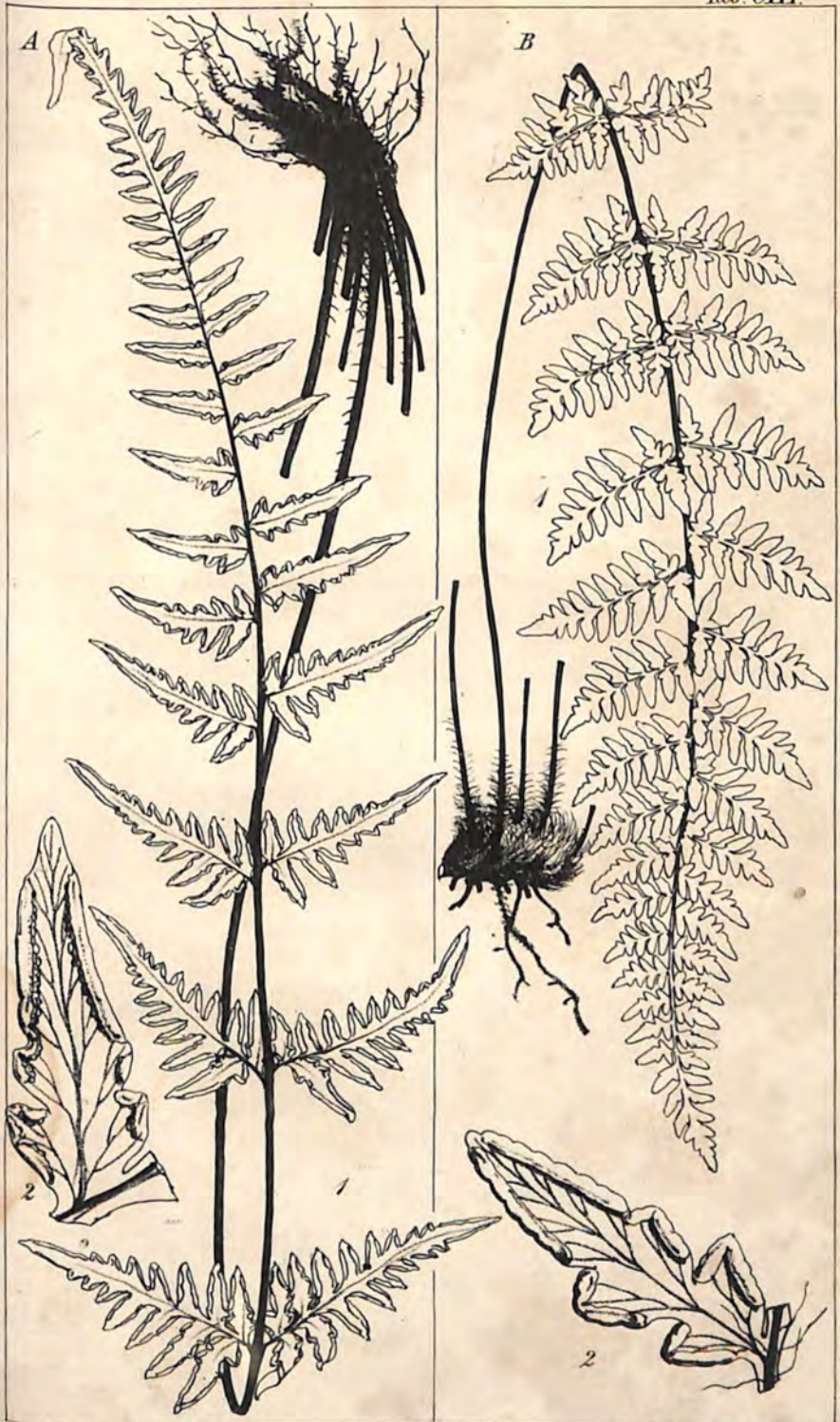
Fitch del et lith.

Pamplin imp.

Tab. CIII.

A. Cheilanthes varians, *Hook.*—p. 89.
Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. Cheilanthes Alabamensis, *Kunze.*—p. 89.
Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*



Fitch del et lith.

Pamplin imp.

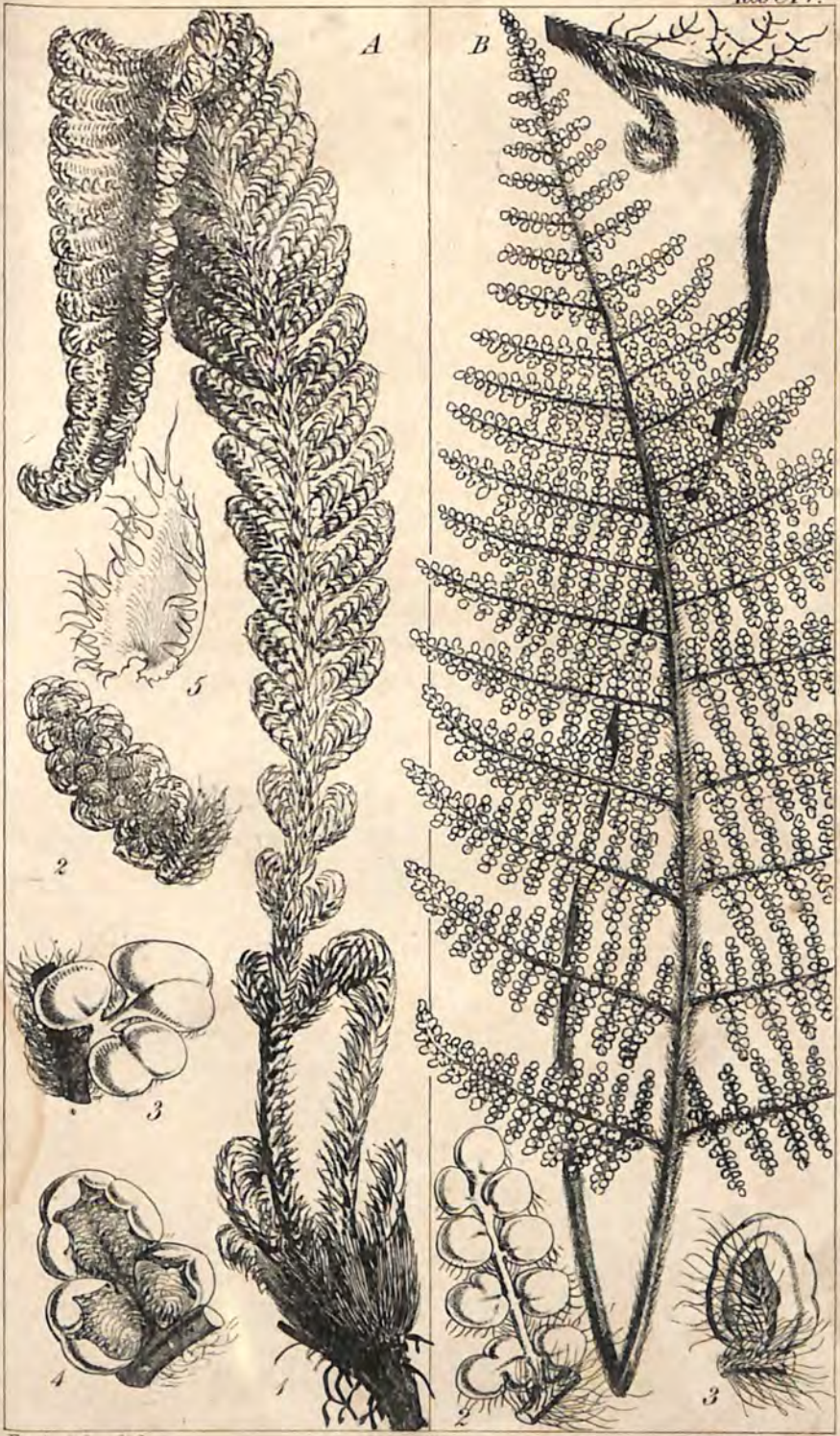
Tab. CIV.

A. Cheilanthes scariosa, *Presl.*—p. 99.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinna, seen from beneath; *magnified.* Fig. 3. Ultimate fertile pinna (of three pinnules), seen from above; and Fig. 4, the same seen from beneath; *more magnified.* Fig. 5. Scale from the rachis; *highly magnified.*

B. Cheilanthes lendigera, *Sw.*—p. 95.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Secondary pinna (fertile), seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *more magnified.*



Fitch del et lith.

Pamplin imp.

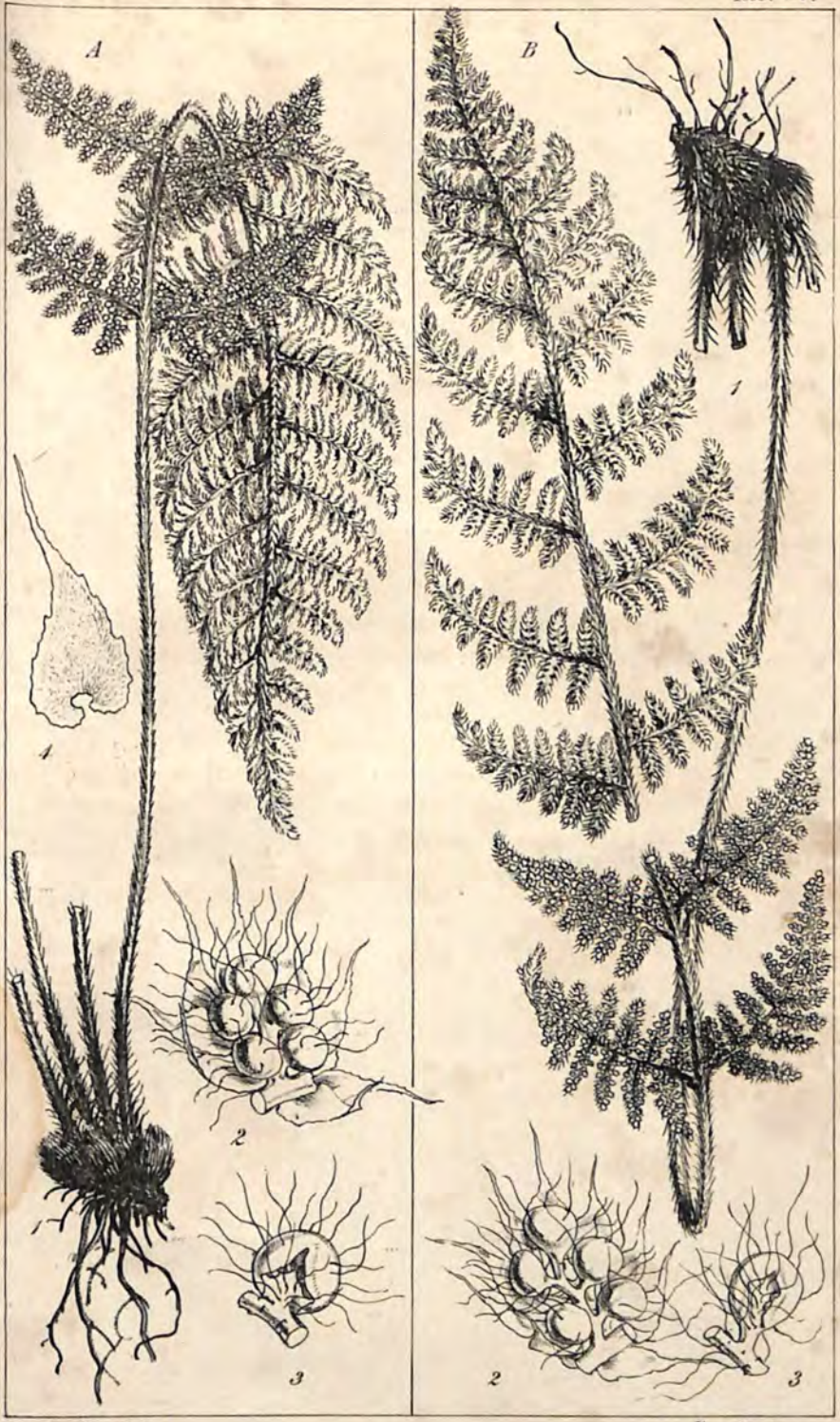
Tab. CV.

A. Cheilanthes myriophylla, *Desv.*—p. 100.

Fig. 1. Fertile frond; *nat. size.* Fig. 2. Secondary pinna (fertile), seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *more magnified.* Fig. 4. Scale from the rachis; *magnified.*

B. Cheilanthes elegans, *Desv.*—p. 102.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Secondary pinna (fertile), seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.*



Fitch del et lith.

Pumplin imp.

Tab. CVI.

A. Cheilanthes lendigera, *Sw.* β.—p. 96.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Secondary pinna, seen from beneath; *magnified.* Fig. 3.* Chaffy hairs from the rachis; *magnified.*

B. Cheilanthes Chusana, *Hook.*—p. 95.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile segment, seen from beneath; *magnified.*

Fitch del et lith

Pamplin imp

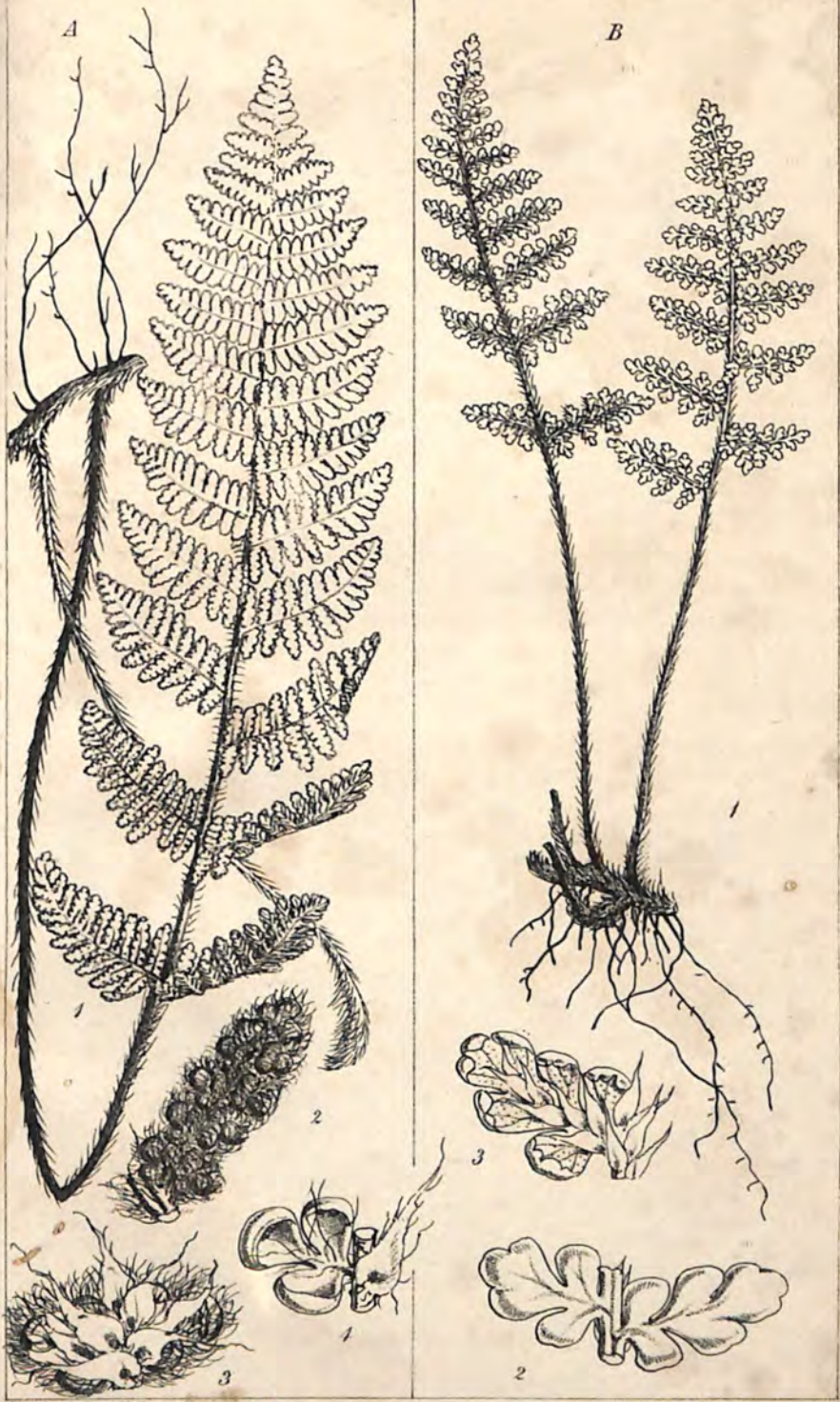
Tab. CVII.

A. Cheilanthes Lindheimeri, *Hook.*—p. 101.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Secondary fertile pinna, seen from above; *magnified.* Fig, 3. Portion of a fertile secondary pinna, seen from beneath; *magnified.* Fig. 4. Ultimate pinna (fertile) of three lobes, or pinnules, seen from beneath; *magnified.*

B. Cheilanthes Fendleri, *Hook.*—p. 103.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile secondary pinnules, seen from above: Fig. 3. A fertile secondary pinna, seen from beneath; *magnified.*



Fitch del et lith

Pamplin imp.

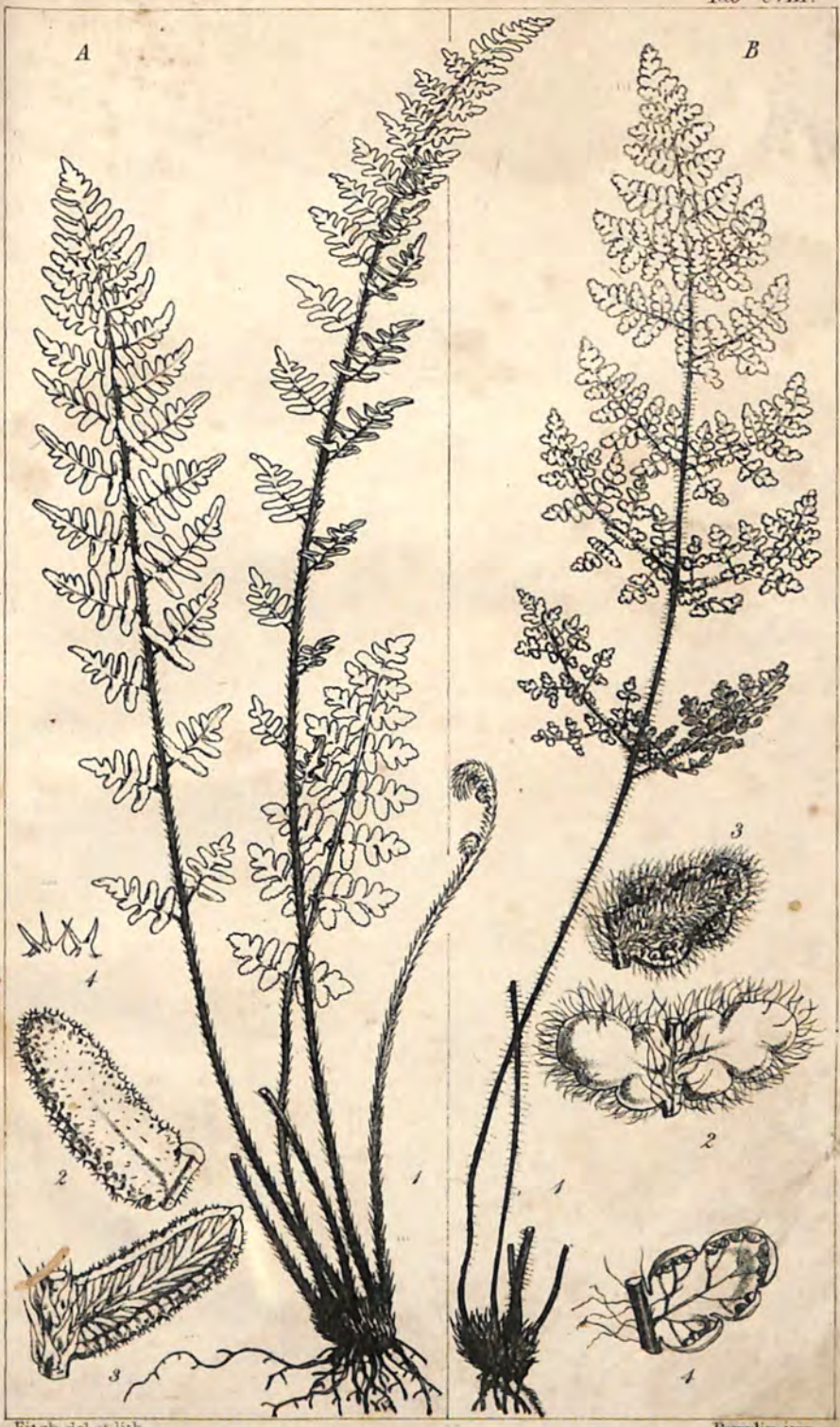
Tab. CVIII.

A. Cheilanthes aspera, *Hook.*—p. 111.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.* Fig. 4. Hairs from the upper surface of the frond; *much magnified.*

B. Cheilanthes vestita, *Sw.*—p. 98.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Tertiary pinnæ (fertile) seen from above: and Fig. 3. One of the same seen from beneath; *magnified.* Fig. 4. Fertile pinnules, seen from beneath, freed from the tomentum; *magnified.*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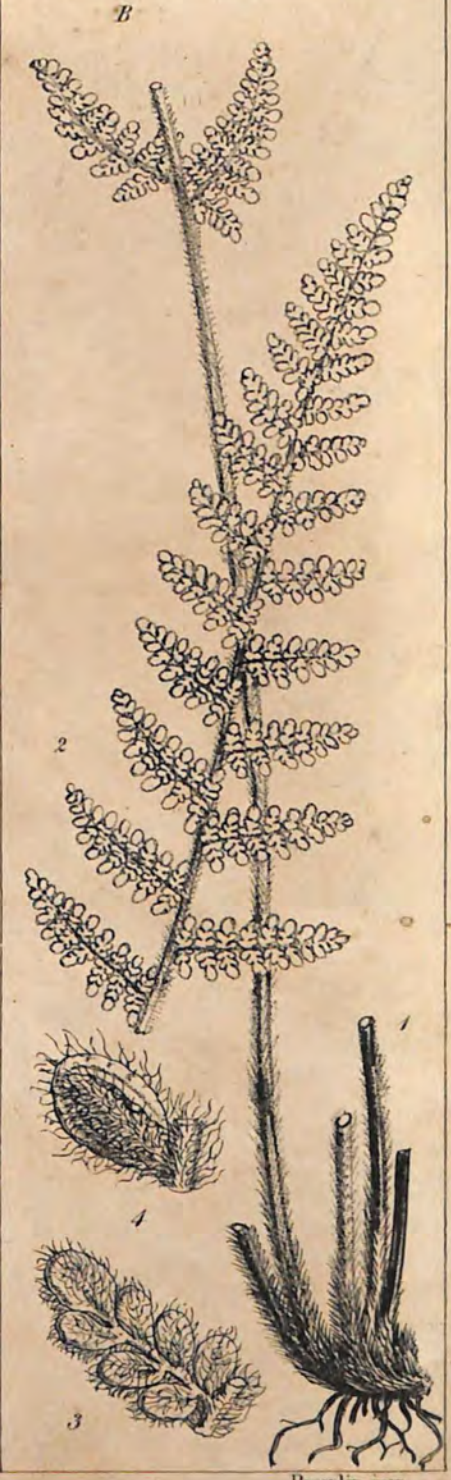
Tab. CIX.

A. Cheilanthes tomentosa, *Link.*—p. 96.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile secondary pinna seen from above; *magnified.* Fig. 3. Fertile pinnule, seen from beneath; *magnified.*

B. Cheilanthes Bradburii, *Hook.*—p. 97.

Figs. 1 and 2. Portions of a fertile frond; *nat. size.* Fig. 3. Secondary fertile pinna, seen from above; *magnified.* Fig. 4. Fertile pinnule, seen from beneath; *magnified.*



Fitch del. et lith.

Pamplin imp.

TAB. CX.

A. CHEILANTHES WRIGHTII, *Hook.*,—p. 87.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.*

B. CHEILANTHES MACLEANII, *Hook.*—p. 93.

Fig. 1. Fertile plant; *nat. size.* Fig. 2. Fertile pinnule, seen from beneath; *magnified.* Fig. 4. Glandular hairs from the rachis; *highly magnified.*

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